Pit and Quarry

SAND - GRAVEL - STONE
CEMENT - LIME - GYPSUM

THE leadership of Hercules in the road-building industry is never more clearly demonstrated than at the Good Roads Shows.

For Hercules Engines and Hercules Power Units have played a most enviable part in tying the country together with new and better roads.

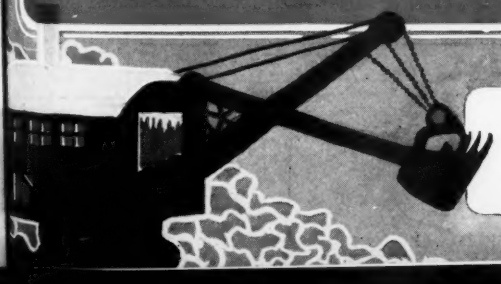
The enlarged Hercules line—20 H. P. to 100 H. P.—makes this engine (of greatest simplicity of design) adaptable to every heavy-duty road-building operation.

Our compact, experienced organization is yours to command.

HERCULES ON THE JOB IN THE ROAD-BUILDING INDUSTRY

Hercules Motors Corporation
Canton, Ohio, U. S. A.

HERCULES
[GREATEST SIMPLICITY OF DESIGN]
ENGINES
[FROM 20 HP TO 100 HP]



January 1, 1926

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Circulation 7,600

INDUSTRIAL

DO YOU KNOW THE WINNING FEATURES?

EFFECTIVE and economical operation requires both speed and the great strength necessary for continuous operation. The INDUSTRIAL WORKS has given thorough study to the conditions under which these machines must operate and has designed them with high speed and of greater strength and reliability than any other machine of this class on the market.

The type DC shown above exemplifies the results attained in the production of material handling machinery, which, on account of its power, strength and efficiency, will accomplish the work demanded of it, with the highest economy in the shortest time.

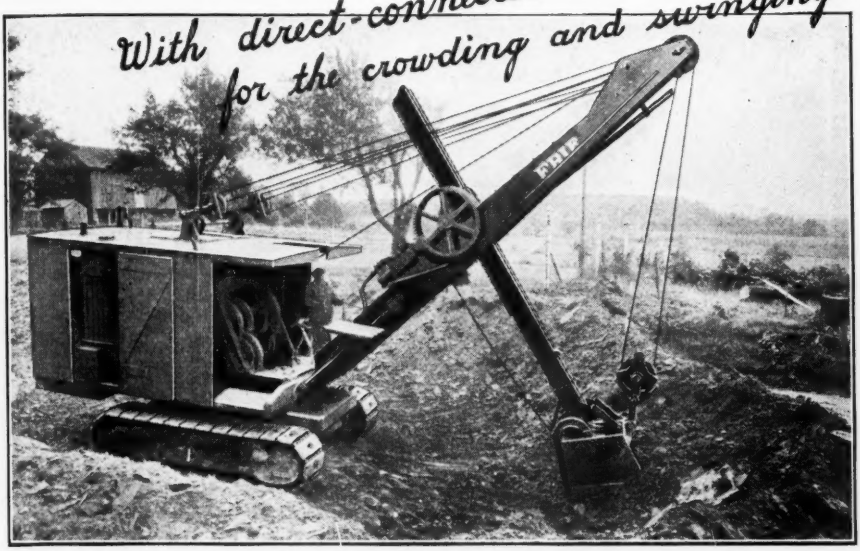
The winning features of the INDUSTRIAL type DC, and those which make possible its splendid achievements, are —extra large rollers in the crawling treads which hold the bearings high up out of the dirt; two speeds for travelling and hoisting; steering and propelling controlled entirely from operator's platform; independent friction clutches for each function; steel castings; bronze bushings; cut gears; and a host of other outstanding superiorities.

The DC is a crane, shovel, dragline, piledriver, clamshell, grapple, magnet, all in one, and it gives maximum efficiency in each service. Start the New Year right by specifying INDUSTRIAL equipment.

Book 120-A will be sent to you promptly upon request.

INDUSTRIAL WORKS · · BAY CITY · MICHIGAN

Gas Shovel



getting entirely away from reversing friction drive on the "crowd" and "swing"

No slipping of swing and crowd clutches in and out—no gears and shafts turning all the time, wasting power and wearing fast. Instead, *direct-connected* double reversing air engines, that work only when crowding or swinging.

The air is supplied by a big heavy-duty compressor, so sturdy that dependable service is a *certainty.*

The heavy-duty gasoline engine—it has 5¾"x8" cylinders— drives the hoist direct, and automatically operates the compressor whenever the shovel is neither hoisting nor traveling. It *stores up the power* that would otherwise be wasted. And the gas engine's exhaust heat is used to raise the compressed air temperature to *above 400° Fahr.*

Real Economy—and Bigger Capacity!

Much faster— digs 25% to 50% more than a single-engine shovel. Uses less gasoline per cubic yard dug.

Digs harder material— as the full power of hoist, crowd and swing can be exerted at the same time.

Costs far less for repairs— this gas shovel has no "reversing frictions" on the hoist, swing and crowd to keep adjusted and in repair. In *reliability* it's a real ERIE— structurally right.

See it at the American Road Show, Chicago, or get the facts in full; drop us a line for complete data.

ERIE STEAM SHOVEL CO., ERIE, PA., U. S. A.

Builders of ERIE Shovels, Cranes, Ditchers, Draglines, Trench Hoes, etc.
Branch Offices: Boston, New York, Philadelphia, Pittsburgh, Atlanta, Chicago
Representatives throughout the U. S. A.

ERIE GAS + AIR Shovel and Crane

Fully protected by basic patents

NEW RAILS RE-AX
AND
ACCESSORIES

EXTENDING OUR RAIL SERVICE
to the
Quarry Fields

Whether your track requirements be One Ton or One Thousand Tons—give us the inquiry and we will hand you the results.

Frog & Switch materials, made to required specifications, are handled on a SHIPMENT-IN-FIVE-DAY basis.

A written guarantee as to the QUALITY of our materials is a part of every contract.

IMMEDIATE SHIPMENTS

MORRISON & RISMAN CO. INC.
BUFFALO, N.Y.

You Have Never Seen a Crusher Lined With Sheet Steel

But Don't Forget!

Every pound of your product that passes through your crusher has to be handled by gravity chutes during its course through your plant and even though your chute linings don't have to stand the pressure exerted against your crusher concaves you're still handling the same abrasive material with probably more cutting edges to gouge and grind out your chute linings quickly unless your plant is equipped with

STRENES CHUTES OR CHUTE LINERS

October 17, 1925.

Relative to our use and experience with Strenes metal we are very well satisfied and think it is the proper application for linings in chutes where extremely abrasive materials are being handled.

The Woodville Lime Products Co.
By John L. Faist, Supt.

Your request for catalogue 26-P will bring you complete information regarding the most economical chute.

THE ADVANCE FOUNDRY CO., Dayton, Ohio

Number 37 Marion Electric Shovel, 1¼ yards capacity, handling up to 2500 tons of sand daily for Mifflin Sand Co., Lewistown, Penn.

A POWER SHOVEL involves a goodly investment which should be carefully made. Since what you really buy (the shovel being merely the medium) is cubic yards or tonnage of material, it behooves you to secure a shovel which will produce rapidly without undue trouble or delay.

Marion Shovels embody features of design and construction which insure exceptional performance. Superior alloy steels are utilized throughout. Marions are the only shovels with manganese steel propelling gears. All shafts are "normalized" so that structural fatigue is unknown. In short, Marions are tough shovels for tough service.

MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

Marion
Power-Shovels
Electric-Steam-Gasoline-Electric

A Mouthful at Every Bite

Guarantee
Owen Buckets, properly installed and operated, are guaranteed to do a bigger day's work than any other bucket of the same weight and capacity —
— or —
Write your own guarantee!
OWEN BUCKET CO.

WHEN you buy a bucket, there is one thing you want above all else. That's digging ability. For when a bucket can't dig, it can't get a heaping load. But Owens are nationally known as buckets, which, like the jungle tiger, get a mouthful—at every bite.

Then there's performance—the day-after-day kind. It takes a sturdy bucket, built to meet actual working requirements, to tear away a mouthful every time the closing line is overhauled. Yet, Owens have been doing that for eighteen years.

These are two of the things you have a right to expect when you buy Owen Buckets. Of course, there are other reasons—seven of them—why you get what you want in an Owen.

Write for the complete story of Owen Buckets and the other seven distinctive points of superior construction

The OWEN BUCKET Co.

106 Rockefeller Building, Cleveland, Ohio

Baltimore	New York	Los Angeles	St. Louis
Pittsburgh	Dallas	Portland	Philadelphia
Chicago	Miami	Minneapolis	San Francisco

INSURE A BIGGER DAY'S WORK

C. O. B. Co.

Replacing the Railroad Shovel

in Mine and Quarry

The New 120-B, 4 yard revolving shovel

Never before has anyone built anything like the 120-B.

It is built to replace the railroad type shovel in mine and quarry.

It is a tremendous big-output shovel for digging ore and rock. It combines in one machine:

1—The speed of action of the railroad-type shovel

2—The mobility of single track caterpillars

3—The Full Revolving Swing

4—Big Dipper capacity—4 cubic yards

5—Ruggedness and Power greater even than the railroad type shovel

Due to its great mobility, operating range and output, the Bucyrus 120-B is revolutionizing quarry operation.

Go and see it. In the meantime send for the bulletin D-1202-A that describes the 120-B—in all its great strength and power.

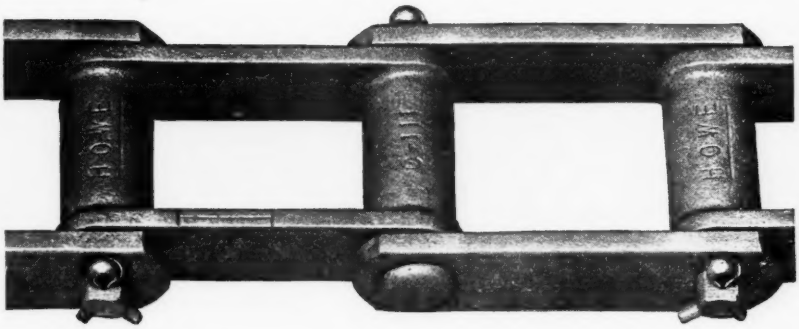
BUCYRUS COMPANY, South Milwaukee, Wisconsin

BUCYRUS

NEW YORK CHICAGO BIRMINGHAM SAN FRANCISCO PITTSBURGH TOKYO LONDON

713

Put Your Chain Problems Up to Specialists



BECAUSE, as specialists, we have designed and built chains for practically every type of service for conveying and power transmission purposes.

Our business has been built up entirely on the merit of our product and the prompt service we have given. We can supply your needs for standard chains, or manufacture chains to meet your special requirements.

The performance records of Howe Chains have maintained our reputation as builders of reliable chains, throughout industry.

For steel drive chains, conveyor chains, malleable iron chains, specify HOWE. Catalog, prices and full particulars on request.

H-1

Howe Products

- Howe Malleable Detachable Chains and Attachments.
- Closed End Pintle Chains.
- Malleable Iron and Steel Combination Chain.
- Heavy Closed End Pintle Chain.
- Ley Bushed Chain.
- Malleable Iron Roller Chain.
- Steel Bushed Roller Chain.
- Steel Strap Chain.
- Drop Forged Steel Chain.
- Malleable Iron Elevator Buckets.
- Sprocket and Traction Wheels.

HOWE CHAIN COMPANY, MUSKEGON, MICH.

CHAIN SPECIALISTS LINK-BELT COMPANY, OWNER

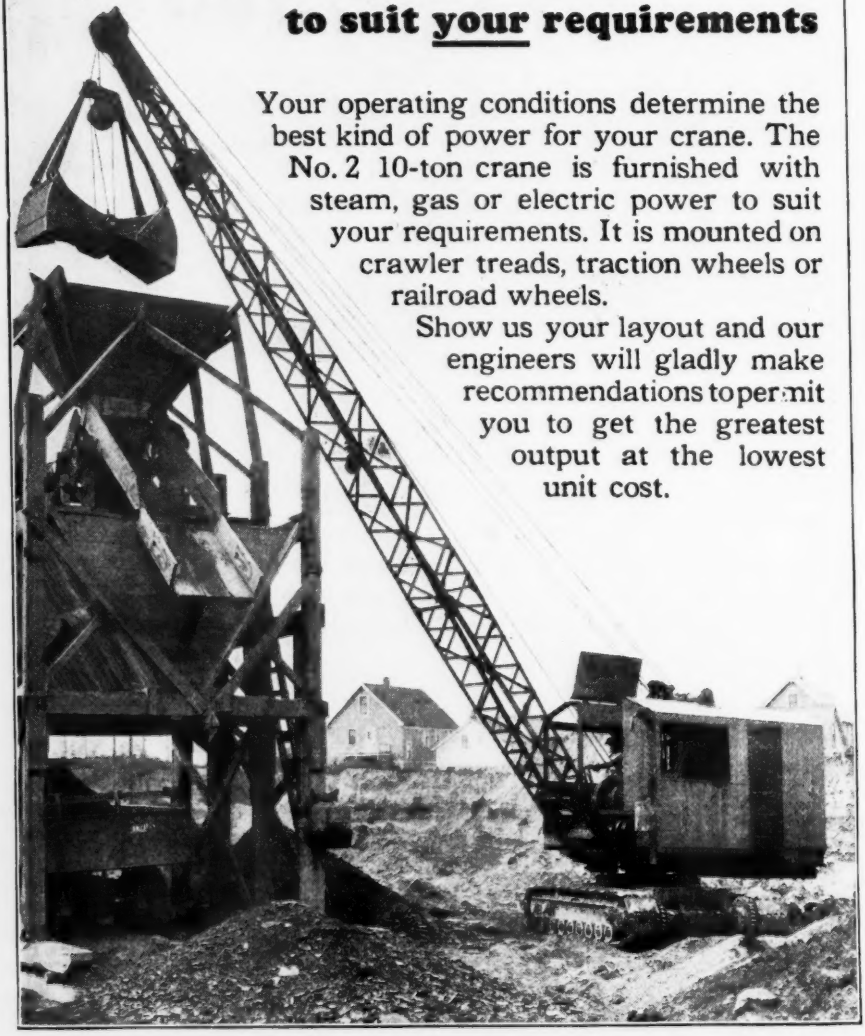
HOWE CHAIN

Steam, Gas or Electric

to suit your requirements

Your operating conditions determine the best kind of power for your crane. The No. 2 10-ton crane is furnished with steam, gas or electric power to suit your requirements. It is mounted on crawler treads, traction wheels or railroad wheels.

Show us your layout and our engineers will gladly make recommendations to permit you to get the greatest output at the lowest unit cost.

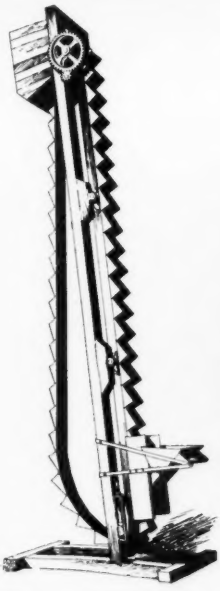


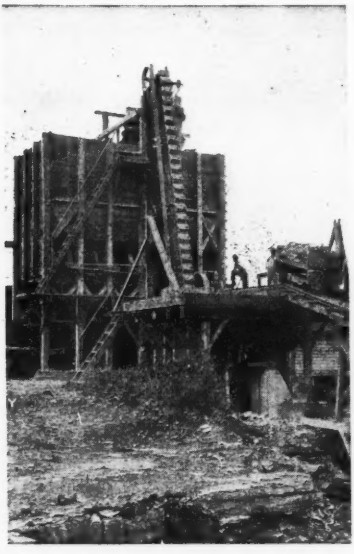
Gas Shovels • Locomotive Cranes • Clam-shell Buckets • Pile Drivers

C-2-105

McMyler-Interstate

NEW YORK BUFFALO PHILADELPHIA PITTSBURGH **CLEVELAND** DETROIT CHICAGO SAN FRANCISCO LOS ANGELES





Standardized—to Economically and Quickly Meet Most Requirements

A JEFFREY Standard Bucket Elevator for handling Crushed Stone, Sand, Gravel, Coal, Ashes, etc., can be readily selected from our Catalog No. 410-A with its carefully arranged data, layouts, and tables of specifications.

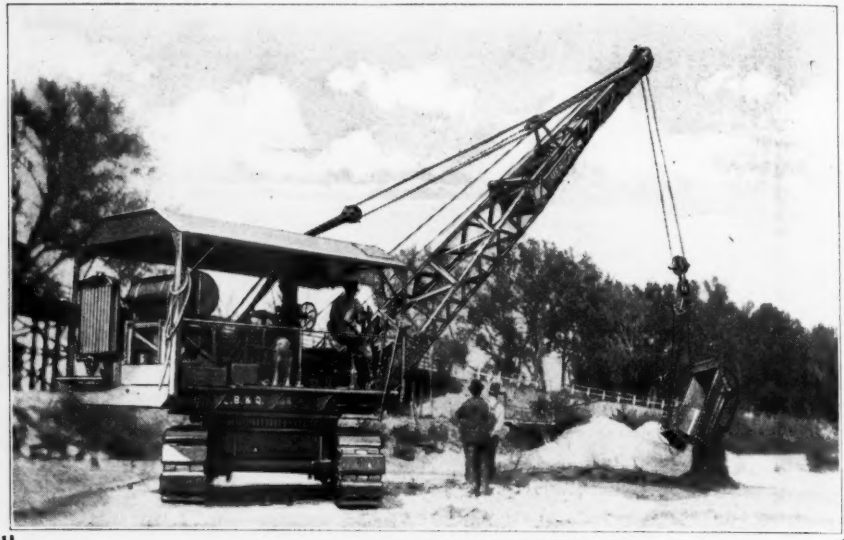
If your local conditions should necessitate a special design—a half century of Jeffrey engineering experience is at your disposal. Consult the nearest Jeffrey Sales Office.

A Complete Line of Pulverizers; Portable Loaders; Screens and Conveyors for Washing and Separating Sand and Gravel; Industrial Locomotives, etc.

The Jeffrey Mfg. Co. 917-919 North Fourth Street **Columbus, Ohio**

New York, Buffalo, Rochester, N. Y., Philadelphia, Pittsburgh, Scranton, Pa., Boston, Cincinnati, Cleveland, Charleston, W. Va., Chicago, Detroit, Milwaukee, St. Louis, Denver, Salt Lake City, Los Angeles, Birmingham, Charlotte, N. C., Montreal

JEFFREY
MATERIAL HANDLING EQUIPMENT



The Sand and Gravel Man's "Triple Threat"—Gasoline Dragline—Shovel—Clamshell Crane

When a football player can run, kick and pass he is spoken of as a "triple threat" and is a valuable and much admired young man.

The "AMERICAN" Gasoline Crane on Continuous Chain Treads, which is shown above, is an all around star performer. It is fast, reliable and accurate. Can work successfully in places inaccessible to other cranes and where a steam machine would be useless on account of bad boiler water.

Full information on request. No obligation.

AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minn.
New York, Chicago, Pittsburgh, Seattle, New Orleans

More yards per day
with the ORTON Shovel

Now's the time to investigate the ORTON ½ yard gas shovel.

It's equipped with a 53-H.P. Hercules Gas Motor. Has a reach of 24′-0″ and dumps the dipper 14′-0″ from the ground.

The ½ yard shovel is just the machine for the small gravel pit where the output is about 400 yards a day. It averages one yard a minute.

Send for a copy of our new Bulletin No. 39 with complete specifications and price.

To Road Show Visitors: Come to Space N.C. 20 and see the new ORTON ½ yard shovel and ¾ yard clamshell crane; a man will tell you all about them.

ORTON & STEINBRENNER CO.

Locomotive Cranes, Flexible Tread Cranes, Gantry Cranes, Truck Cranes.

608 So. Dearborn Street
CHICAGO, ILL.

Clamshell Buckets, Orange Peel Buckets, Rock Crushers, Power Shovels.

BAY CITY MODEL 4 ONE-MAN EXCAVATOR

HALF YARD CAPACITY

THE POPULAR PIT SHOVEL

KEEPING 5 BIG TRUCKS BUSY

Loading gravel with a strata of boulders for Arthur de Pasquale. It's "as much shovel" as he needs, and his investment in equipment is small. With half yard shovel and powerful crowd, the Model 4 is ready to dig and load 300 to 400 cu. yds. each day shift—at lowest cost.

Hercules 4-cyl. Motor—Silent Chain Drive—Alemite Lubrication.

YOU CAN USE THE MODEL 4 WITH SHOVEL, CLAM, SKIMMER OR DRAGLINE

Model 4—Half Yard

THESE NEW CATALOGS will be mailed on request

—

No obligation

—

Write for yours today.

Model 16-B—¾ Yard

BAY CITY DREDGE WORKS Bay City, Mich.

Eastern Office—302 Broadway, New York City

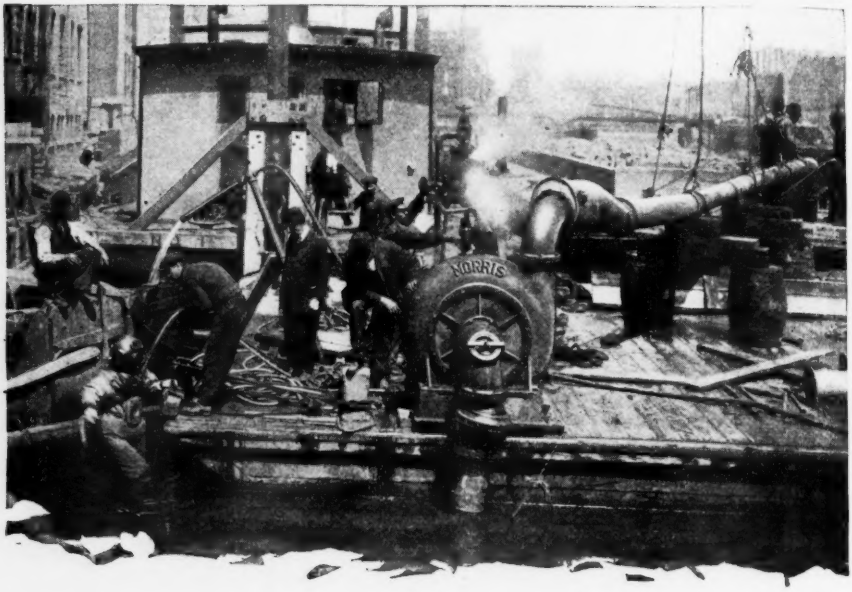
MASSILLON
Means Minimum Maintenance

Sturdy, fast, a glutton for work, The MODERN MASSILLON type 22 cuts operating costs unbelievably. Operators using this shovel will all say that value and economy are built into it.

See us at Road Show

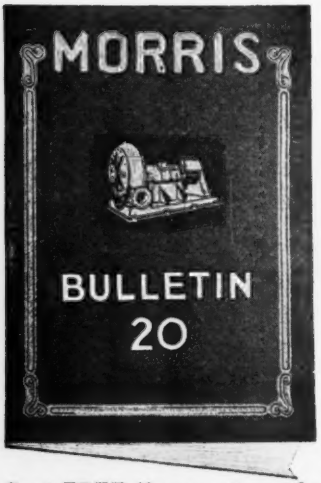
THE RUSSELL & CO.
BUILDERS
MASSILLON, OHIO

The MODERN MASSILLON
Steam — 3/4 – 7/8 RANGE — Shovel



Whether it's dredging, land reclamation or recovery of sand and gravel for construction purposes, we can furnish the correct pumping equipment.

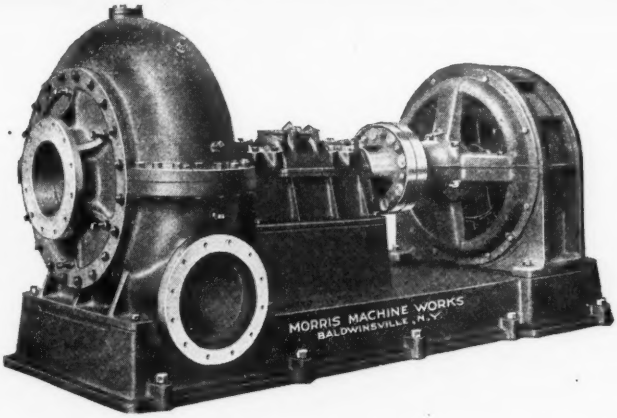
TRANSPORTING semi-solid material by hydraulic methods and for every purpose, has been a specialty with us for 61 years.



Sent FREE if you return the coupon

Together and during their long experience, our engineers have studied hydraulic handling problems in rivers, harbors, industrial plants, etc., have figured on every kind of power, steam, electric and oil engine, have designed pumps, cutters and dredges, to draw from all practical depths and deliver at all practical elevations and distances, and have designed and built successfully for every installation we have undertaken.

The Morris Machine Works is therefore today unique in the variety and size of its standard outfits for any hydraulic material handling operation, in the accumulation of data upon which to base new design and in the uniform satisfaction given by its installations.



If you have excavating, handling or filling operations where hydraulic methods are not, but should be utilized, or if you want to know why, how and at what costs hydraulic methods ought to be considered on new projects, the benefits of Morris experience and the free advice of our engineers are yours for the asking.

Meeting your needs at full capacity or within fixed time limits, and protection of your profits make at least a free preliminary conference with us desirable.

Ask us for Bulletin 20 on Hydraulic Dredging, Filling and Conveying.

Originators of Centrifugal Pumps, both single and multi-stage, and builders for practically all purposes since 1864.

Branch Offices: New York, 39-41 Cortlandt St.; Philadelphia, Forest Bldg.; Cleveland, Engineers' Bldg.; Chicago, 217 N. Jefferson St.; Boston, 79 Milk St.; Pittsburgh, 320 Second Ave.; Detroit, Penobscot Bldg.; Charlotte, Realty Bldg.; Houston, 119 Main St. Salem Representatives: Buffalo, St. Paul, Kansas City, Denver, Salt Lake City, Seattle, Portland, Ora, Los Angeles, New Orleans.

Morris Machine Works,
Baldwinsville, N. Y.

Please send Bulletin No. 20.

Name .....

Company .....

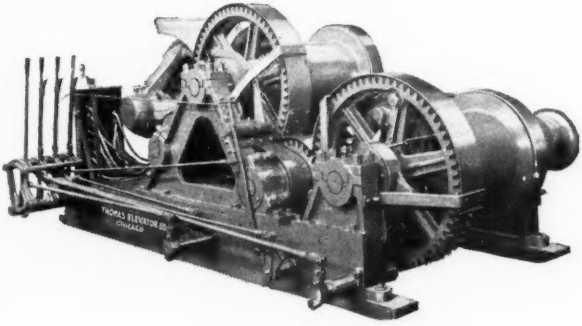
Address .....

.....

MORRIS
CENTRIFUGAL PUMPS

To us, the advent of 1926 symbolizes renewed opportunity to serve our friends, old and new, and if we can further their prosperity by any effort, be it great or little, we shall count the time well spent.

TRAYLOR
ENGINEERING &
MANUFACTURING CO.
ALLENTOWN, PENNA.



THOMAS HOISTS for Sand, Gravel and Stone Producers are specialized hoists—the results of many years of experience. They are designed and built to produce maximum tonnage with minimum expense. They are made in single and two speed types, electric, gasoline or steam power, for Dragline Cableways, Drag Scrapers, Derricks, Suction Dredges and Car Haulage.

The hoist is a very important part of your plant—the best is the cheapest in the long run. May we have an opportunity to tell you more about the THOMAS HOIST?

THOMAS ELEVATOR COMPANY

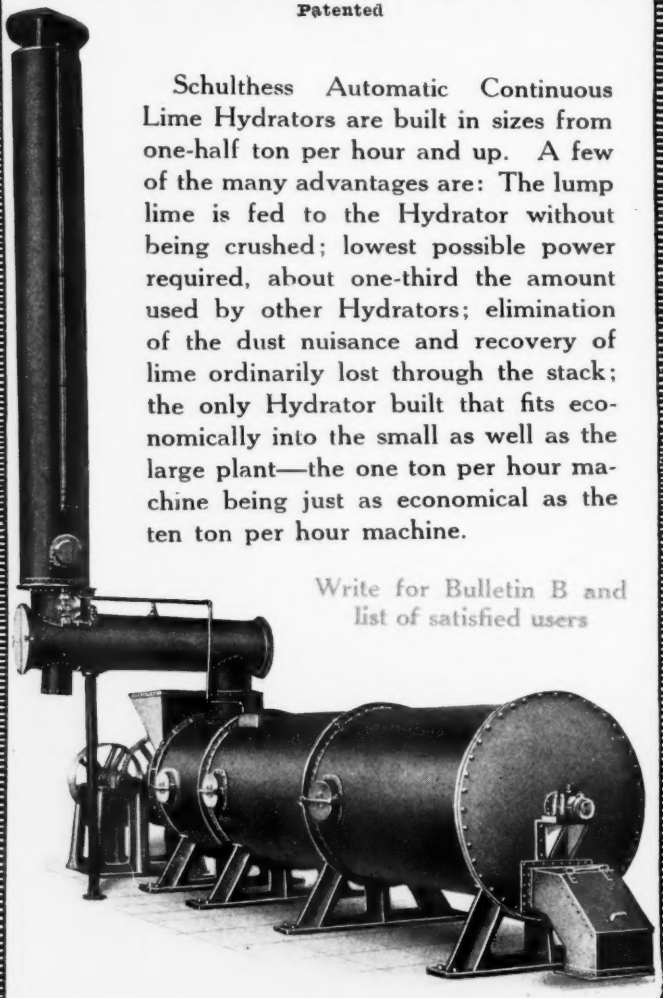
21 South Hoyne Ave., Chicago

THOMAS HOISTS

McGANN MANUFACTURING COMPANY, INC.
Engineers and Manufacturers
CHICAGO YORK, PA. NEW YORK

The Schulthess Hydrator

Patented



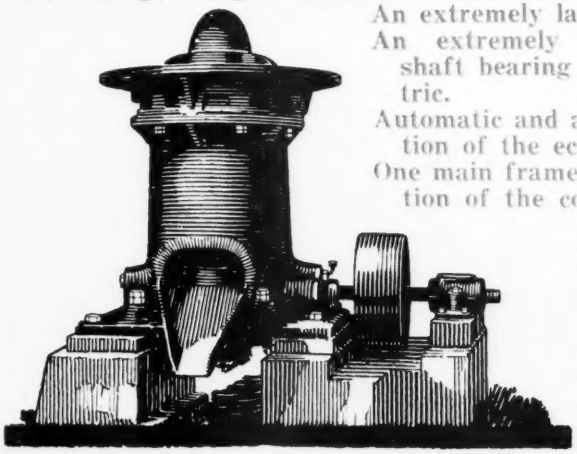
Schulthess Automatic Continuous Lime Hydrators are built in sizes from one-half ton per hour and up. A few of the many advantages are: The lump lime is fed to the Hydrator without being crushed; lowest possible power required, about one-third the amount used by other Hydrators; elimination of the dust nuisance and recovery of lime ordinarily lost through the stack; the only Hydrator built that fits economically into the small as well as the large plant—the one ton per hour machine being just as economical as the ten ton per hour machine.

Write for Bulletin B and list of satisfied users

YORK Kiln | SCHULTHESS Hydrators | YORK Double Shell Dryers

Austin Super Crushers

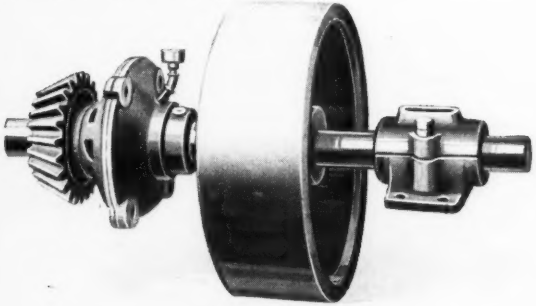
These Crushers are built especially for crushing extremely hard rock and gravel to small sizes. They are approximately the same size as the Standard No. 3, 4 and 5 Austin Gyratories. All proven improvements were incorporated in the design of the Super Crushers, and among their distinguishing characteristics are the following:



An extremely large eccentric.
An extremely large lower shaft bearing in the eccentric.
Automatic and ample lubrication of the eccentric.
One main frame for any position of the countershaft.

The countershaft has a bearing on each side of the pinion as in the Standard Crusher. The countershaft bearings are removable, and both inside and outside bearings run in removable bronze bushings. The picture at the bottom of the page shows the assembled countershaft which fits into the main frame. The outside bearing makes a dust and oil proof cover for one of the oil cellar openings, while the other two openings are also made dust and oil proof by machined casting covers.

The lubrication of the eccentric is very effective. The pinion, running in oil, picks up the oil and throws it on the under side of the sloping diaphragm from which it flows into a trough above and completely surrounding the eccentric. This trough contains a series of evenly spaced holes through which the oil flows, lubricating the inside and outside of the eccentric. The overflow lubricates the inside countershaft bearing.



Super Crushers are all that the name implies. We would like to tell you more about the service and satisfaction that one of them will give you.

AUSTIN MANUFACTURING CO.
400 N. MICHIGAN AVE., CHICAGO

EASTON CAR & CONSTRUCTION COMPANY

GENERAL OFFICES AND WORKS, EASTON, PA.

CARS
FOR ALL
INDUSTRIAL PURPOSES

IN REPLY REFER TO

OFFICES
KANSAS CITY
NEW YORK
PHILADELPHIA
PITTSBURGH
CHICAGO
SAN FRANCISCO

Dec. 25, 1925.

GREETINGS:

We speak so often during the year of our Product that a word regarding our Policy does not seem out of place at this season.

No product can be better than the policy of the company behind it.

Just now our plant is closed for ten days and every employee, salaried and hourly, is enjoying a vacation on full pay.

We pay full wages for as much as 30 days to any employee who may be taken sick.

We have given to every employee a life insurance policy.

We voluntarily reduced the daily hours of work - without reducing the daily pay of our men.

We all say "Good morning," so we carry no grouch.

We believe that where contentment reigns the product is bound to be right.

Our regard for our employees is a fair measure of the consideration we will give your confidence.

A copy of our "Industrial Relations" will be sent you on request.

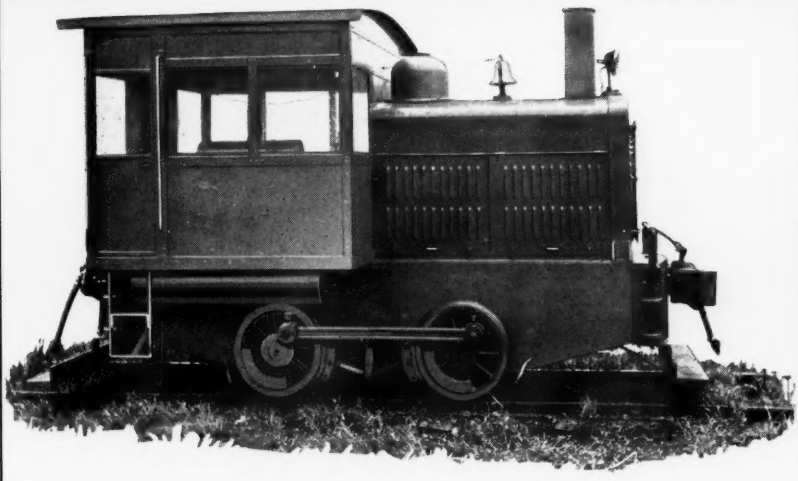
We Wish You a Happy and Prosperous New Year.

Yours truly,

EASTON CAR & CONSTRUCTION COMPANY

W. E. Farrell

President.



More Horse Power Per Ton

When you buy a locomotive do you get ample horse power per ton? "Whitcomb's" are built with from 10 to 16 horse power per ton—more than enough to do the work their rating promises. That's why "Whitcomb's" stand the gaff—uneffected by grades up to 11%, they will out-haul any other type of haulage equipment of similar rating, be it powered by gasoline, steam, or electricity.

On actual test "Whitcomb" Locomotives have shown a capacity 50% greater than a steam dinkey of same tonnage.

This extra heavy power—plus the high track clearance—short overhang and low center of gravity—make "Whitcomb's" the best for every haulage job.

Our Engineering Department will gladly help you to select the proper type of locomotive for your work—this service is gratis. Or may we send you catalogs on "Whitcomb's" of any gauge or size up to 25 tons.

Geo. D. Whitcomb Company

Rochelle **Illinois**

Offices in principal cities

GASOLINE – STORAGE BATTERY – ELECTRIC

WHITCOMB

LOCOMOTIVES

THE INSLEY EXCAVATOR

Not to do the work of a large shovel—But to do the work a large shovel can't do—PROFITABLY

"Bring on Your Trucks"

"He spun a yarn that could not possibly be true, in order to sell his goods," was the opinion of H. S. Coulter, Oxford, Ohio, prior to buying his machine, when an Insley representative told him about the INSLEY TYPE C EXCAVATOR. After he had used the machine for two months, Mr. Coulter said *"that a salesman had told the truth for once, I can vouch for that."* Mr. Coulter used his machine to dig basements, make road cuts, strip macadam streets, load material from a stock pile into trucks, and even as a tractor to pull trucks out of difficulties.

INSLEY
CONCRETE PLACING EQUIPMENT
STEEL DERRICKS
BUCKETS AND CARS
EXCAVATING EQUIPMENT

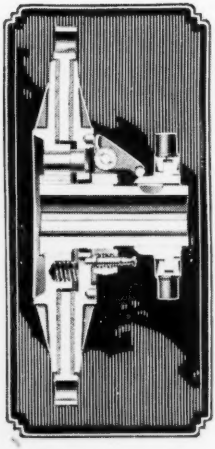
The opinion of a salesman concerning his product may be taken with a grain of salt, but the opinion of the man who has paid his good money for it will be taken as the truth. Mr. Coulter sums up his experience with the Insley by saying, "You are to be complimented for bringing on the market a machine that has the stamina and wide range of usefulness that it has."

Mr. Coulter's experience is similar to that of scores of owners of Insley Excavators, who have been surprised that they could buy so much for so little money, that a light machine could handle such a volume and variety of work, and that any small machine could excavate as economically as the Insley does.

INSLEY MANUFACTURING CO.
Engineers and Manufacturers
INDIANAPOLIS

THE INSLEY IS LITERALLY A DIRT EATER EXCAVATOR

TWIN DISC CLUTCHES



THE lowest work factor tolerated in a Twin Disc installation is twice the capacity of the motive power.

This margin insures the faithful performance of the clutch in any emergency. It enables the machine to turn out the volume of work for which it is designed. It provides a greater degree of clutch flexibility, thus doing away with life-shortening shocks and strains on engine and working parts.

Consult with our Engineering Department.

TWIN DISC CLUTCH COMPANY

RACINE WISCONSIN

REPAIR SERVICE STATIONS

E. George & Co., Broome and Wooster Sts., N. Y. City.
James R. Howell, 6715 Quimby Avenue, Cleveland
Coast Machinery Corp,, Los Angeles
F. Somers Peterson Co., San Francisco
Nash Motor Sales Co., Raleigh, N. C.
Motive Parts Co. of America, Inc.,
Chicago, Cincinnati, Des Moines, Indianapolis

Announcing!

The SUPER

VIBRATING SCREEN

for

Sand—Gravel—Stone

Twice the Capacity at Half the Cost

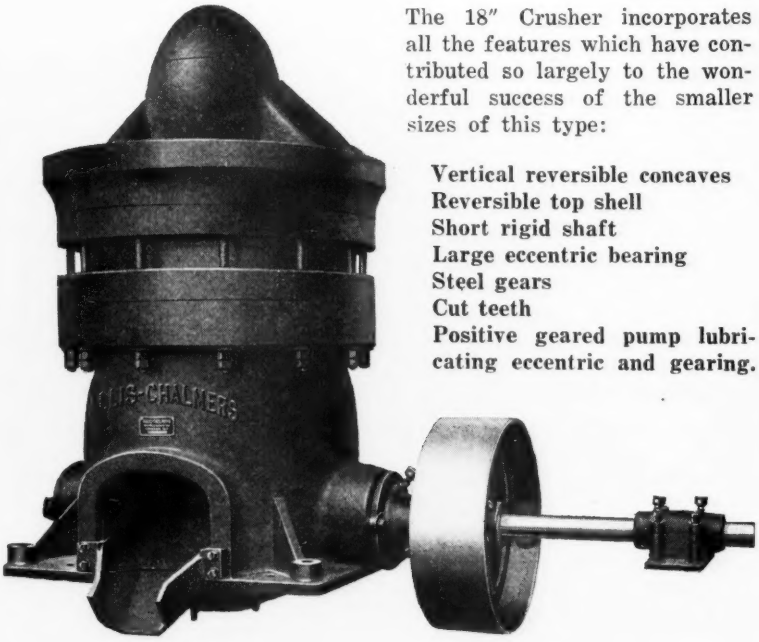
Literature?

Simplicity Engineering Co.
Durand, Mich.

See our exhibit—Nat. Road Show—Booth E. B. 15

New 18 Inch Superior McCully Fine Reduction Gyratory Crusher

The latest development in the Superior McCully Fine Reduction line, furnished to a large Cement Company—Having two feed openings each 18″ by 68″—Capable of taking the product from the largest size primary crushers—Capacity with minimum discharge opening of 2½″—225 to 275 tons per hour.



The 18″ Crusher incorporates all the features which have contributed so largely to the wonderful success of the smaller sizes of this type:

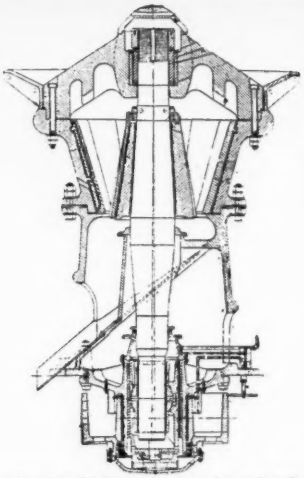
Vertical reversible concaves
Reversible top shell
Short rigid shaft
Large eccentric bearing
Steel gears
Cut teeth
Positive geared pump lubricating eccentric and gearing.

ALLIS-CHALMERS
MILWAUKEE, WIS. U.S.A.

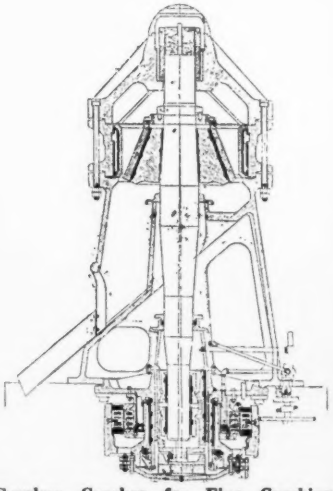
THE CRUSHERS
with the
Troubles Left Out

WHY THEY LEAD

1—They are noiseless and run like watches.
2—50% greater capacity for same power.
3—Practically no wear on anything but head and concaves.
4—Short shaft and saving in head room with packed dust collars.
5—Shaft reinforced with self-locking head so that it cannot break where 90% of shafts have broken.
6—Can be driven right, left, or standard, as sent from shop.
7—Eccentric is turned by flexible coupling attached to pulley, which prevents side thrust and heating, as in geared crushers.
8—Ball and socket eccentric, self-aligning, eliminating friction and heating. Runs for years without attention.
9—Positive circulating oil system through filter and cut geared oil pump.
10—Made in our own shop by experts, trained for the job.
11—It is a crusher with the trouble left out. See it in operation, and you are unfit to listen to any geared crusher salesman. In fact, if you are near one of his machines, you can't hear him, if you are so inclined.
12—Our fine crusher does the work of 4 geared crushers.



Standard Ball Bearing Gearless Crusher. Sizes No. 1 to No. 60—Weights 1,000 to 900,000 lbs.



Gearless Crusher for Fine Crushing. Do not be deceived by Vertical Concaves; that is not what makes a fine crusher.

Send for catalogue and tell us what your problems are, and one of our experts will call on you without obligation on your part.

KENNEDY VAN SAUN MFG. & ENGR. CORP.

50 Church St. **NEW YORK**

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414 So. Spring St., Los Angeles, Calif.
Annex Hotel, St. Louis, Mo.
1739 Roanoke Bldg., Chicago, Ill.
73 Cullinan Bldg., Johannesburg, So. Africa
40, Rue des Mathurins, Paris, France

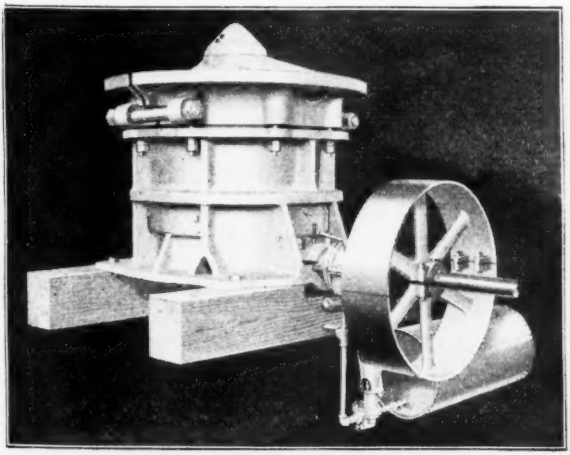
The Beaten Path to Telsmith's Door

The world beats a path to the door of him who perfects a better mouse trap. So said Emerson, and history bears him out.

Since 1906 Telsmith has been making a better crusher—and a great many orders have come to Telsmith's door. In the last eight years Telsmith's annual sales have increased 800% and the plant was twice enlarged. Now we have just moved into our modern, new factory, 6 acres of ground, 55,000 square feet of buildings—built to accommodate our ever-increasing business. This—and the fact that other manufacturers are adapting their crushers to Telsmith principles, as near as Telsmith patents permit—prove that Telsmith really is **the better crusher.**

But the world is a big place—and there are all kinds of things made in it. It then behooves the maker of the better article to tell people how and why it is better—and help them find the way to his door. And that is the purpose of Telsmith in using the printed page—merely to aid you in keeping abreast with the latest in crusher development—in which Telsmith is continuing more and more to take the lead.

Why not become more familiar with Telsmith's improvements? We will gladly send catalog No. 161 (Telsmith Primary Breaker) and Bulletin No. 2F15 (Telsmith Reduction Crusher).



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Milwaukee, Wis., U. S. A.

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TELSMITH

ALL STEEL

SEE THIS CRUSHER

Road Show—Booth N. C. 9

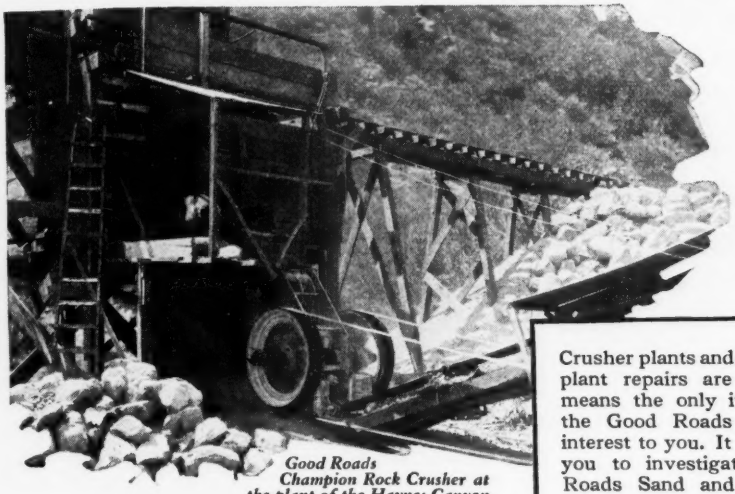
Superior in construction. Very simple in design. Easy to install and operate. Will do the work of other type installations costing two to four times as much. Manganese equipped. Easily and quickly adjusted for fine or coarse crushing. 20 sizes to choose from. 10 large sizes with capacities to 450 tons per day. All easily portable. Guaranteed to give satisfaction on the hardest rock and gravel.

Built for the Service of a Lifetime

Write for information

UNIVERSAL CRUSHER COMPANY

619 C Ave. West **Cedar Rapids, Iowa**



Good Roads Champion Rock Crusher at the plant of the Haynes Canyon Rock Co., Los Angeles, Calif.

Be sure to see our exhibit at the Chicago Road Show.

Crusher plants and crusher plant repairs are by no means the only items in the Good Roads line of interest to you. It will pay you to investigate Good Roads Sand and Gravel Plants and Gravel Screening Plants.

Good Roads MACHINERY

TRADE MARK

UNDIVIDED RESPONSIBILITY!

—that is what enables us to install crushing plants that are profitable to the user

THE responsibility is all ours when you deal with us in the matter of plant construction. From start to finish, the burden is off your shoulders altogether.

Our engineers go over your location, check the material, and lay out the plant. Building, equipment—everything—we carry out the whole job in a manner that will give greatest satisfaction, and make most money for you in the end.

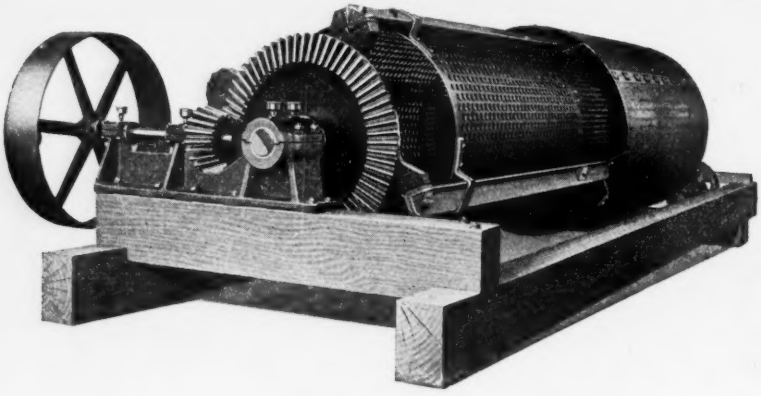
In the installation of a plant, large or small, or in adding to your present equipment, it is hazardous to trust to luck. You want to be assured of a proper lay-out, of durable, efficient machinery, and of the backing of an established concern of unquestioned reliability.

Such assurance is associated with the name of The Good Roads Machinery Company, Inc.

Write today for Crusher Catalog K.A.U., or Sand and Gravel Catalog 5-A

The GOOD ROADS MACHINERY CO., Inc.
KENNETT SQUARE, PENNA.
Service and delivery branches in principal cities

Good Roads MACHINERY



TOEPFER

REVOLVING SCREENS

QUALITY IS ALWAYS SELF-EVIDENT

With the reputation for integrity which is behind the builders of Toepfer Revolving Screens, it only remains to be said that we are building into and will continue to build into our product that value which always influences decision. Let us fill your requirements.

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REVOLVING SCREENS
SCRUBBERS
ELEVATORS
FEEDERS
GRIZZLYS
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BIN GATES
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W. TOEPFER & SONS CO.

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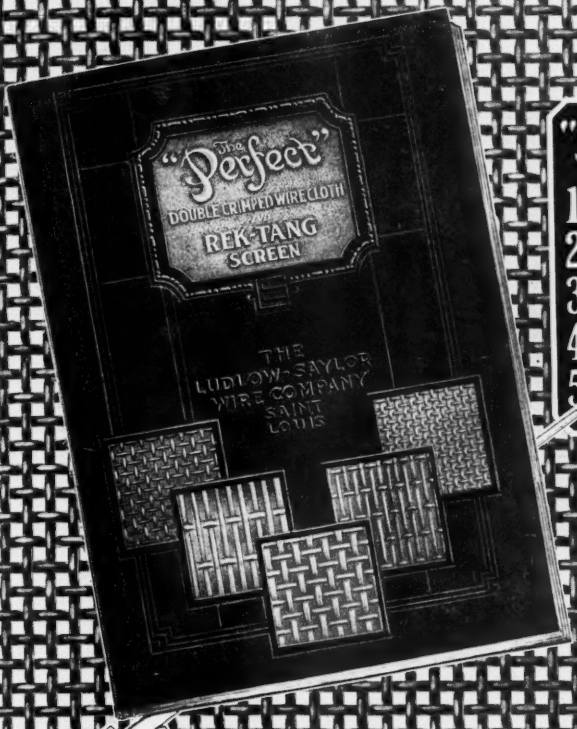

"Perfect" Service

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LUDLOW - SAYLOR WIRE CLOTH, properly selected and applied to your equipment, will **screen more feed, take out more fines,** and **raise the average effectiveness of every subsequent process.**

Our new Catalogue No. 47-E4 is a Text-Book on Screens.

Get your copy from the first edition.

MEMO

The Ludlow-Saylor Wire Co., 610 So. Newstead Av., St. Louis.

Send us one copy of Catalogue No. 47-E4 which lists The Thousand "Perfect" Woven Screens.

Firm .....

By .....

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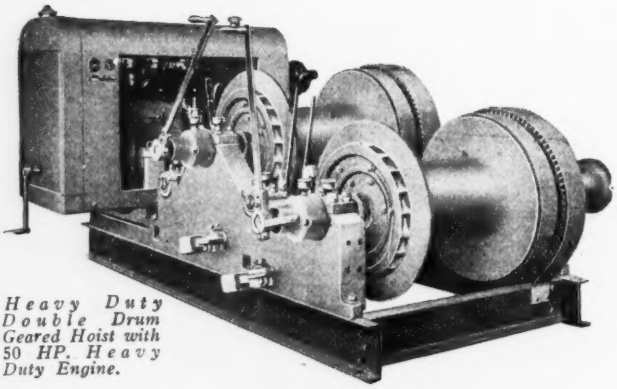
"The City Surrounded by the United States"

The LUDLOW-SAYLOR WIRE COMPANY St. Louis

Cut off waste power!

O-K HOISTS



Heavy Duty Double Drum Geared Hoist with 50 HP. Heavy Duty Engine.

You can economize best with an O-K HOIST

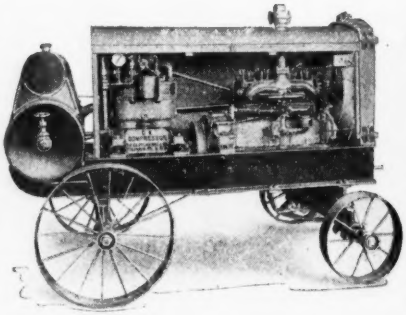
Big savings and greatly increased efficiency, are possible with the *right* hoist. The O. K. hoist has especial merit, because it reduces *lost power* to a minimum. *It stands the gaff of the hardest service without breakdowns.*

O. K. Hoists are equipped with Heavy Truck Type Gasoline Engines of the multiple cylinder type, have ample reserve engine capacity, are sturdy, comparatively light in weight, and easily moved about. O. K.'s are furnished in sizes 8 H.P. up to 130 H.P. in two, four and six cylinder engines, one, two and three drum hoists with boom swinger.

O. K. Portable Air Compressors

O. K. Air Compressors are built to meet the heavy, exacting requirements of pit and quarry. They are tried, tested and proven to be correctly adapted to any air equipment, and they have larger capacity than other types.

Made in three sizes, with capacities 118 cu. ft., 160 cu. ft., and 260 cu. ft., per min. Gasoline or eletric motor. Steel wheels or rubber tire mountings.

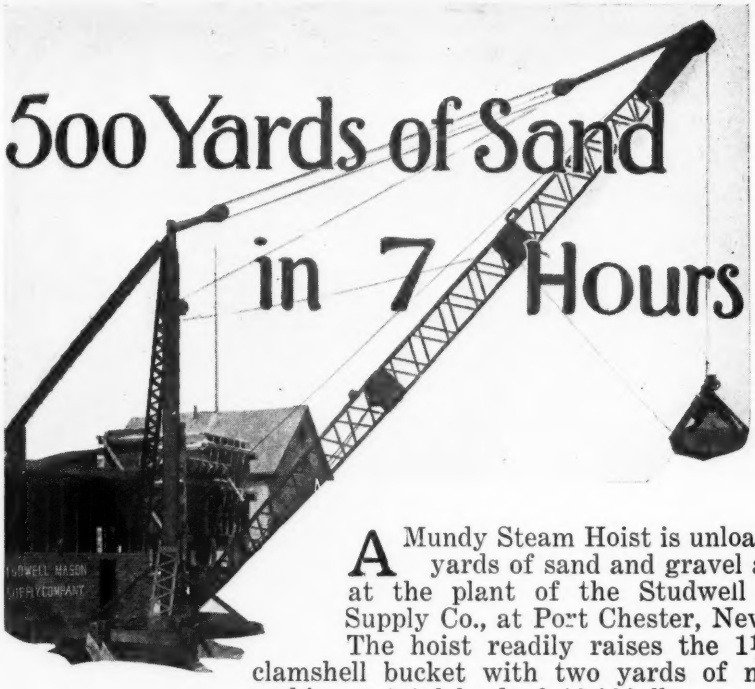


Write for full descriptive literature

O. K. CLUTCH & MACHINERY CO.

BOX 305, COLUMBIA, PA.

500 Yards of Sand in 7 Hours

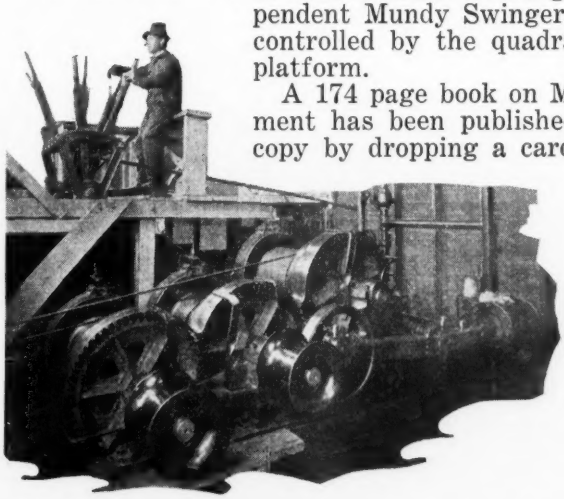


A Mundy Steam Hoist is unloading 70 yards of sand and gravel an hour at the plant of the Studwell Mason Supply Co., at Port Chester, New York. The hoist readily raises the 1½ yard clamshell bucket with two yards of mixture, making a total load of 10,000 lbs.

MUNDY TRADE MARK ESTABLISHED 1869

The stiff leg derrick is operated by a 10½"x 10" three drum hoisting engine with an independent Mundy Swinger. This rig is entirely controlled by the quadrant stand on a raised platform.

A 174 page book on Mundy Hoisting Equipment has been published. You can get your copy by dropping a card.



The Mundy Sales Corporation

30 Church St., New York, N. Y.

Agents in Principal Cities

MUNDY HOISTS

THE HOIST WITH THE ASBESTALL FRICTIONS

Ohio Gravel Ballast Co., Cleves, Ohio

Enduring Satisfaction with Webster Material Handling Equipment

When you provide Webster Material Handling Equipment for your plant you get a service of known value. You are not speculating on unusual, untried construction features of questionable durability and operation.

For over a quarter of a century Webster Material Handling Equipment has made good in large and small operations. Mechanically correct in design and dependable in operation, built for years of hard service—that means lasting satisfaction.

Webster engineers will gladly consult with you on your handling problems.

THE WEBSTER MFG. COMPANY

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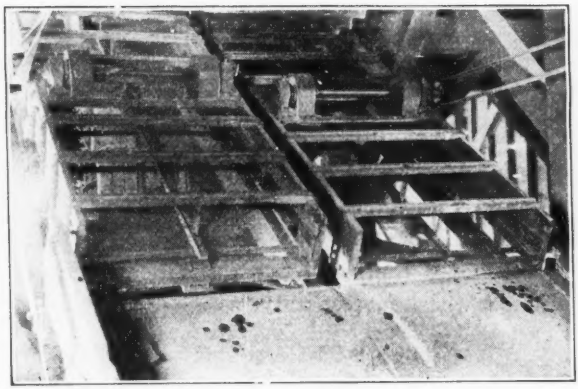
Happy • New • Year



PERFECT PERFORMANCE

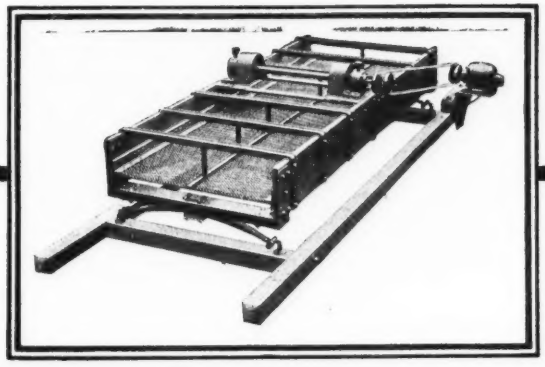
Screens shown in above cut were installed last spring in the new and modern plant of the Lutz Stone Company at Oshkosh, Wisconsin. In a letter received from this Company, they say:

> *"Screens are working out in fine shape. The material, wet or dry is screening perfectly and you may be assured that we are more than pleased. Do not hesitate calling on us for a recommendation any time."*

Improve the quality of your material during 1926, by installing UNIVERSALS.

UNIVERSAL VIBRATING SCREEN CO.

RACINE ~ ~ WISCONSIN

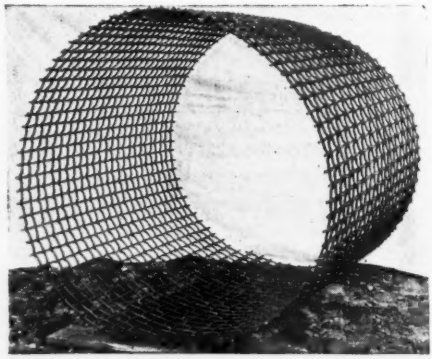


It's Easy—

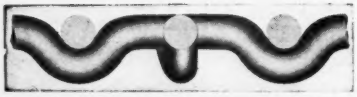
To Understand Why

ROL-MAN Woven Manganese Steel Screens with the Double Lock Mesh increase production and wear longest, giving a cleaner, more uniform product. Being lighter than perforated plate they require less power to operate. Their high abrasive resistance increases with wear under the heaviest duty.

A trial installation results in the permanent adoption of ROL-MAN Woven Manganese Steel Screens. They are made in all sizes and shapes and are used in some of the largest plants.



THE WEARING SIDE HAS A SMOOTH FLAT SURFACE



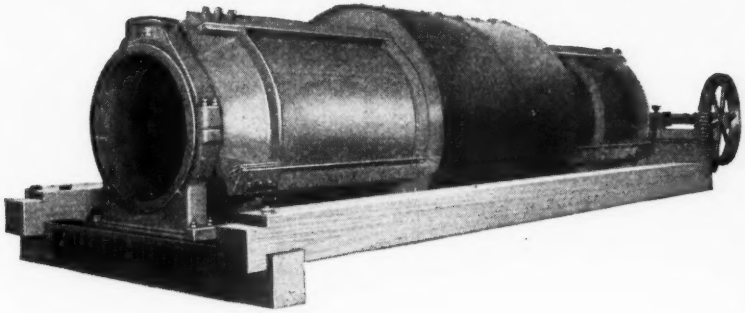
CROSS SECTIONAL VIEW OF MESH

Manganese Steel Forge Co.

Manufacturers of ROL-MAN Manganese Products

TRADE ROL-MAN MARK

RICHMOND & ERIE AVE. PHILADELPHIA, PA.



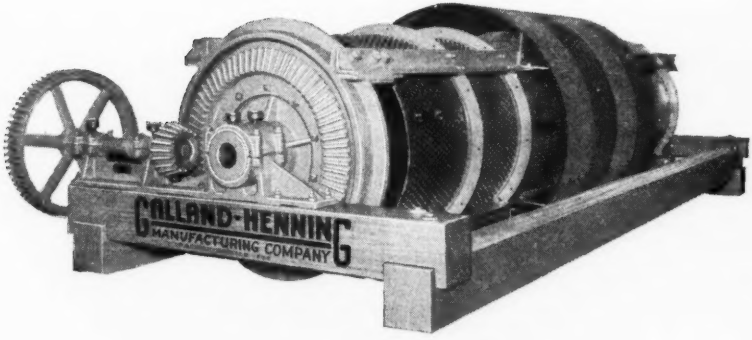
Here's Two 60-Inch Diameter, 20 Feet Long

ROLLERLESS ROTARY SCREENS

RECENTLY INSTALLED AT THE GRAND RAPIDS GRAVEL CO.
GRAND RAPIDS, MICH.

COMPLETE PLANTS DESIGNED AND EQUIPPED

WRITE FOR BULLETIN H-35



GALLAND-HENNING
MANUFACTURING COMPANY
MILWAUKEE — U. S. A.

Increase Your Footage with CP Equipment

THE increased footage to be obtained from Chicago Pneumatic Equipment has been clearly demonstrated on the excavation work for the new Tex Rickard Sport Arena, New York City. On this job, Clarence L. Smith, Inc., has kept a card record of each drill runner's performance.

This system of checking shows that the CP-10 Sinker Drills, which replaced the competitive machines formerly used, have increased the drilling average from 80 to 135 feet per 8 hour day. The high record so far for an 8 hour day is 166 feet.

CP-10 Sinker Drills are supplied in wet and dry types for heavy sinking, extremely hard ground and long down-hole drilling in difficult formations. One-inch hollow, hexagon steel with collared shank is regularly employed, and chucks for 7/8" steel are available on special order.

The Chicago Pneumatic Compressor shown supplied the power for the operation of these sinkers. CP Portable and Stationary Compressors are supplied in steam, oil, belt and direct motor driven types to meet all requirements.

USERS of CP Products are assured prompt and efficient service at all times. Service stations, covering the entire country are stocked with spare parts, and are equipped to render repair and maintenance service.
J-222
Chicago Pneumatic Tool Co.
New York, N. Y.

Divide The Cost

By

The Years They Last

THINK of Westinghouse motors on a service-rendering basis. Many that were installed twenty-five years ago are still on the job and *doing* the job. Twenty year old Westinghouse motors in actual service are even in greater number. At fifteen years their number becomes legion.

Extremes of heat and cold, dust, dirt, moisture, chemicals—Westinghouse motors have encountered and conquered them all.

If you think of these service records the next time you are on the point of buying a motor, you will specify Westinghouse: The cost is less because the service is more.

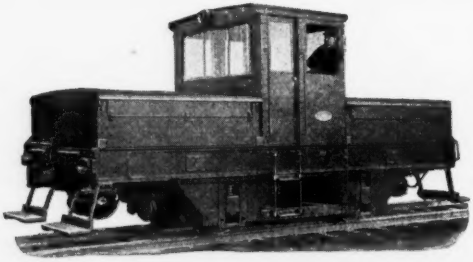
Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries

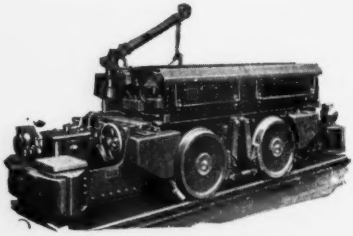
Westinghouse

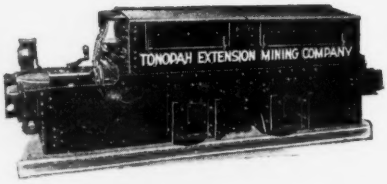
X8779S

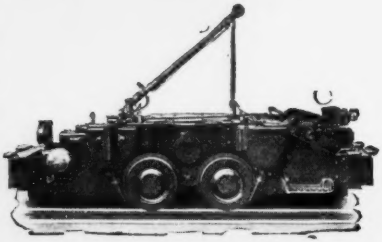
GOODMAN ELECTRIC LOCOMOTIVES

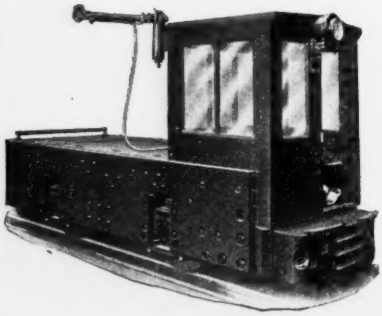
TROLLEY, BATTERY OR THIRD RAIL OPERATION

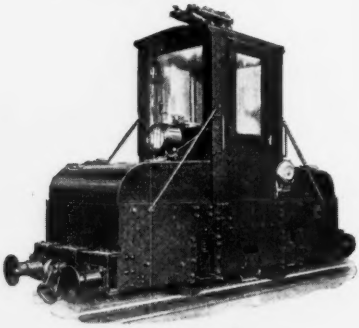












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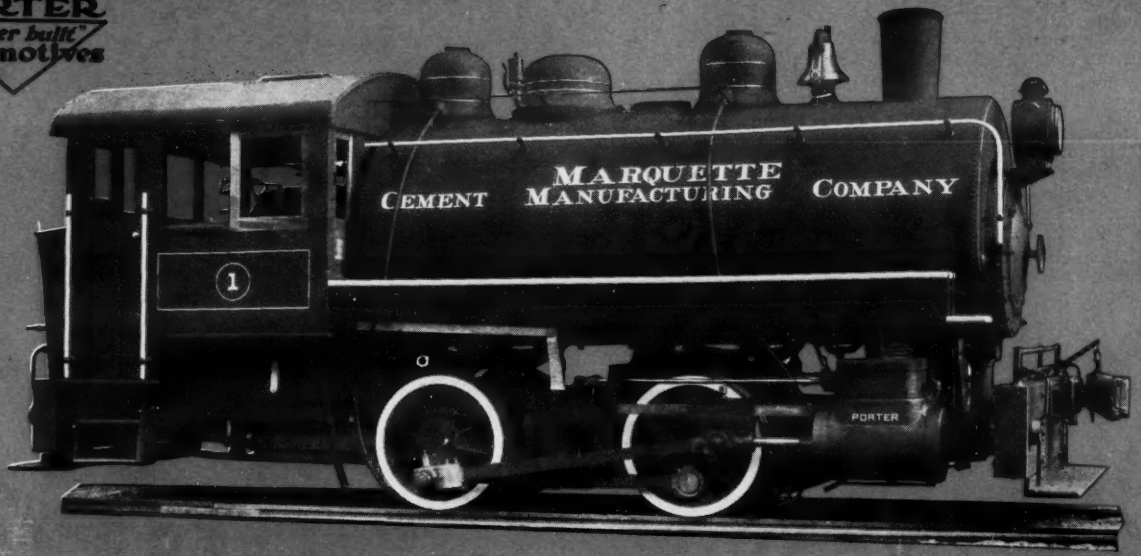
Simplicity

PORTER
"better built"
locomotives

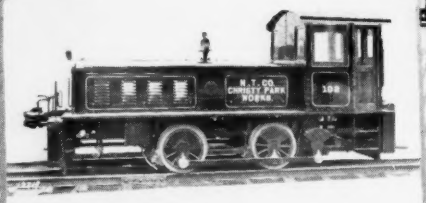
The well designed, well built Porter is also remarkably simple, allowing prompt easy access to all moving parts. There's no better locomotive built in the world to-day.

H. K. PORTER COMPANY
PITTSBURGH, Established 1865 PENNA.



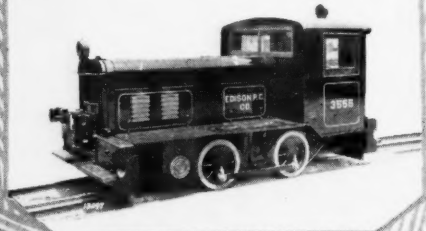
They wanted the best so they selected this

16 ton

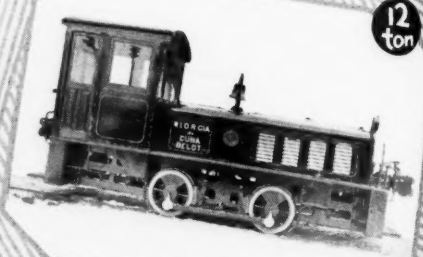


16 ton

8 ton

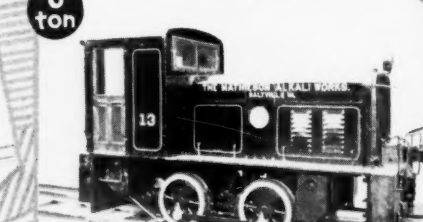


12 ton

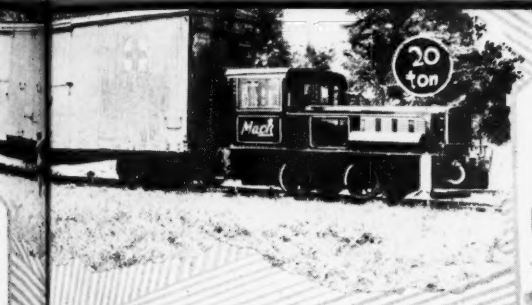


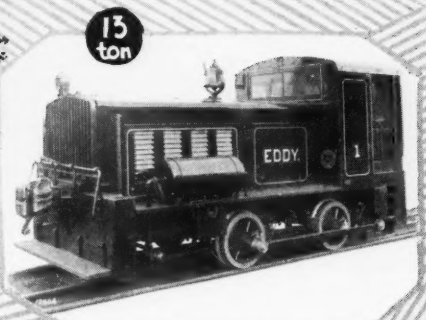
8 ton

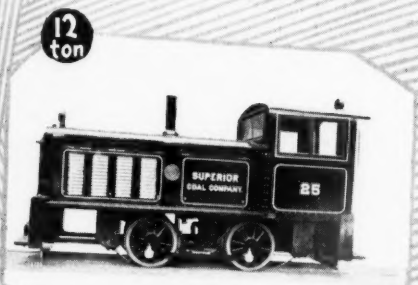
8 ton

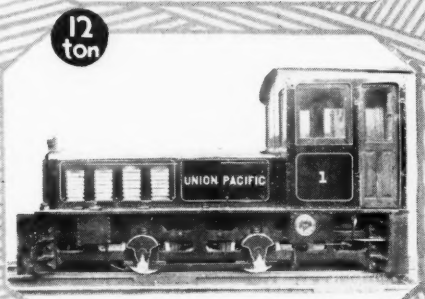


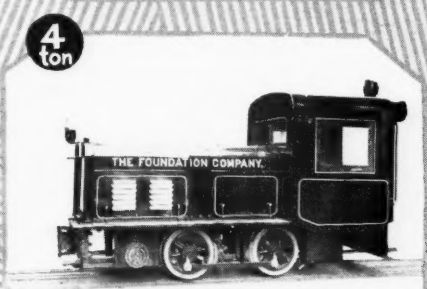
gear-driven gasoline locomotive











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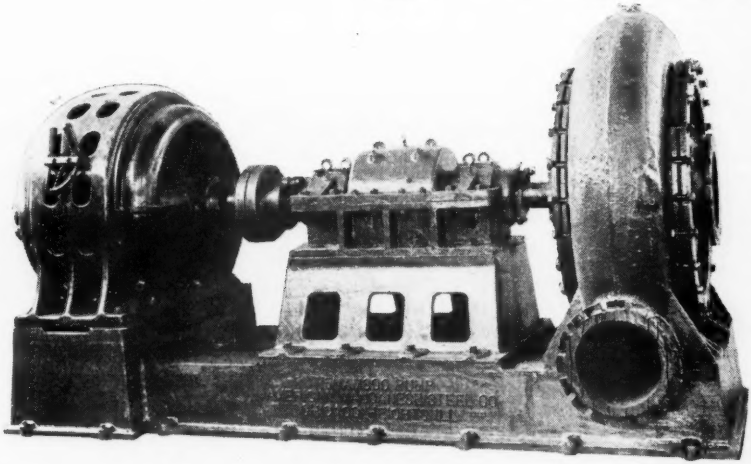

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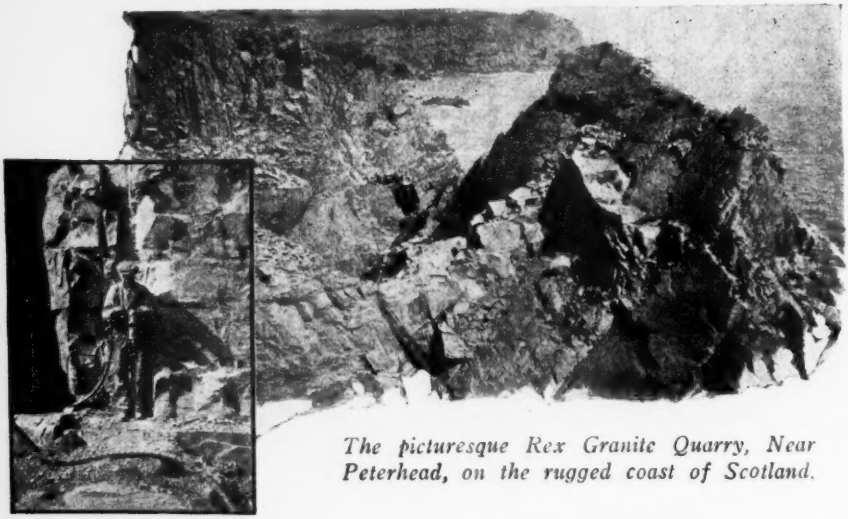

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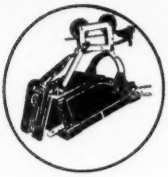

Pioneer
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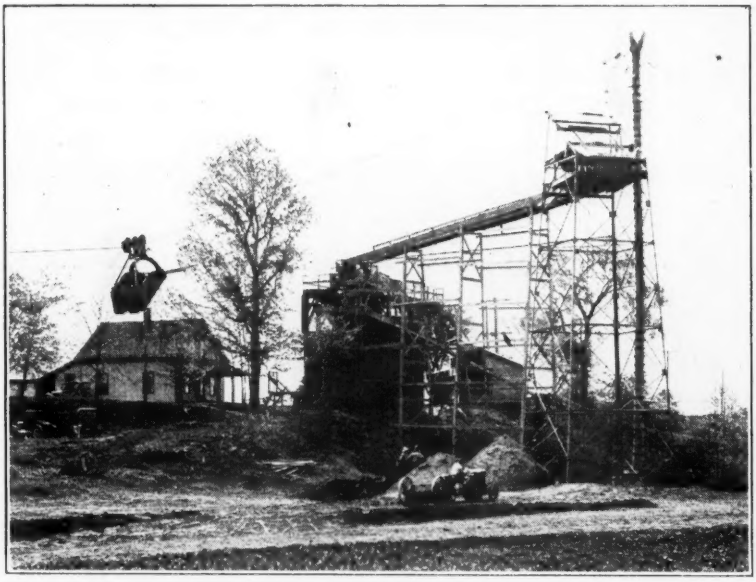

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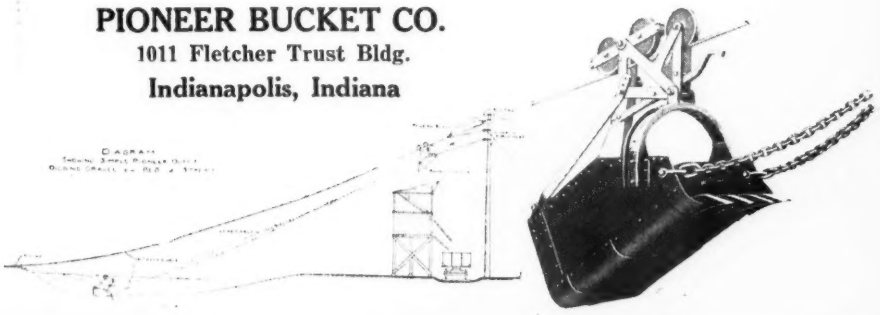

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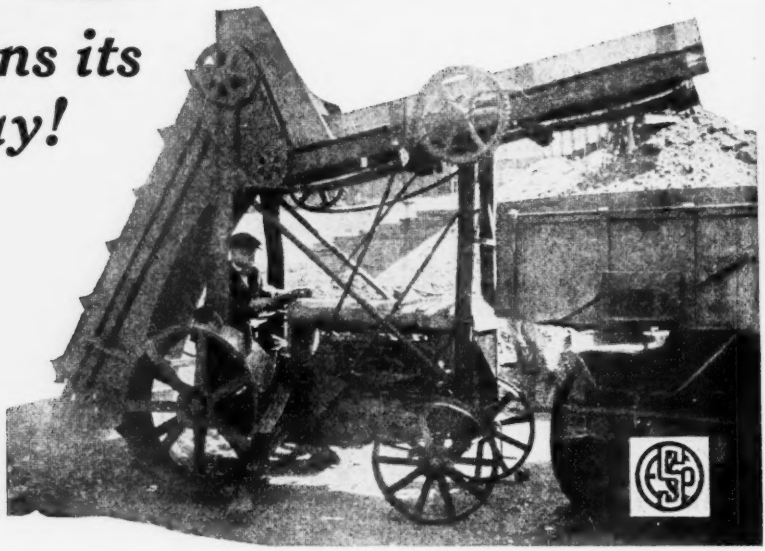
Wins its Way!



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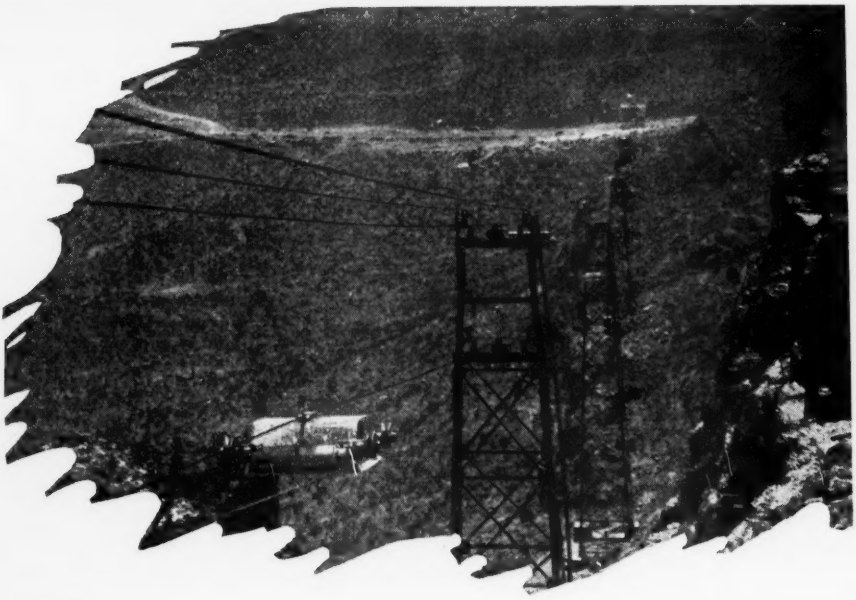

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Now — A Complete New Shovel

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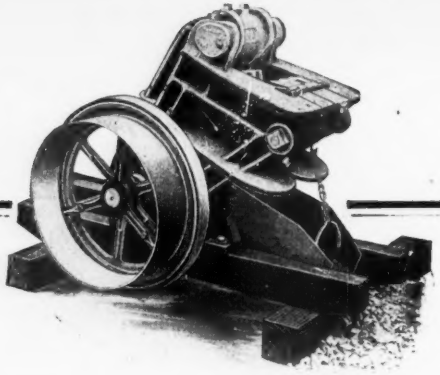

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Pit and Quarry

A Semi-Monthly Publication for Producers and Manufacturers of Sand, Gravel, Stone, Cement, Gypsum, Lime and Other Non-Metallic Minerals.

Vol. 11 CHICAGO, ILL., JANUARY 1, 1926 No. 7

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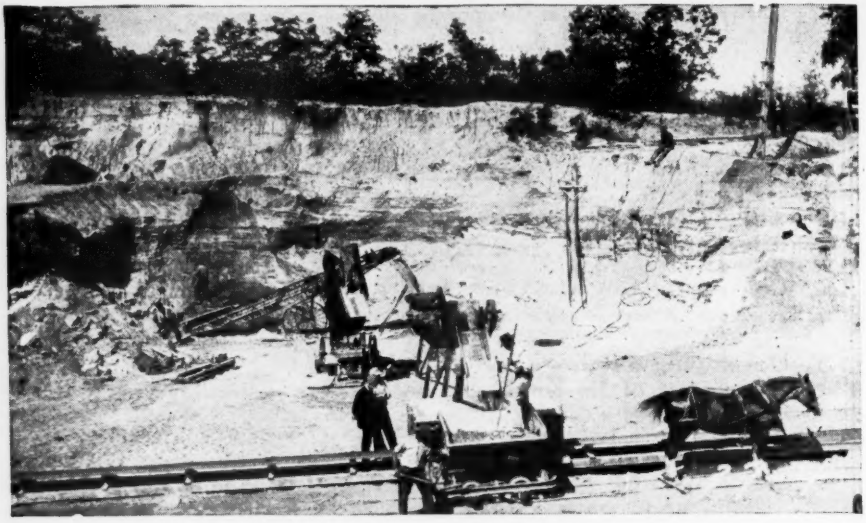

A Flexible Handling Layout That Holds Down Costs

Many pit owners are finding that a flexible Barber-Greene handling layout, that can be quickly changed to meet changing needs, is often instrumental in holding pit costs to a low level.

Actual digging operations, while perhaps not far away from the washing, screening or loading plant, often move so rapidly that handling equipment cannot keep up with them.

Here is where Barber-Greene Conveyors step in to do their bit in keeping red ink off the books.

Each Barber-Greene Portable Conveyor is a separate unit that can be used singly or as one of a series. A layout made up of such machines is exceptionally flexible. It can be arranged and rearranged quickly to meet varying needs. And the cost of changing and rearranging is negligible. In addition, new units can be added, when expansion demands, at an exceptionally nominal cost.

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Pit and Quarry

Vol. 11 Chicago, Ill., January 1, 1926 No. 7

Concerning Government in Industry

THE present session of Congress will see an effort inaugurated by more than one hundred trade associations to halt appropriation of public funds for use by governmental bureaus in purely commercial activities. This will be the national phase of a campaign to be launched by a permanent coalition just formed in Washington by the nation's industrial leaders to combat "government in business."

State, county and municipal authorities who "enter into competition with private initiative for the sake of political expediency or sheer extension of bureaucracy" will also feel effects of the campaign, according to leaders of the Conference on Government in Industry, as the coalition is to be known. Intrusions by these smaller units of government are designated by the business men as "even more vicious" than those of the federal body.

First plans for the movement to enforce the principle that the "functions of government are political and not economic" were laid at a meeting held early in December by 175 industrial leaders representing all the major lines of commercial activity.

The conference voted to establish headquarters in Washington through which the following committee, which it elected, will act as the directing force for all existing organizations taking part in the movement:

Homer L. Ferguson, president, Newport News Shipbuilding and Drydock Company, Newport News, Virginia; F. Highlands Burns, president, Maryland Casualty Company, Baltimore, Maryland; J. E. Edgerton, president, Lebanon Woolen Mills, Lebanon, Tennessee; S. M. Williams, vice-president, Auto-Car Sales and Service Company, Ardmore, Pennsylvania, and Gen. R. C. Marshall, Jr., general manager, Associated General Contractors of America, Washington, D. C.; Mr. F. J. Koster, president, The Koster Company, San Francisco, California; W. O. Washburn, president, American Hoist & Derrick Company, St. Paul, Minnesota; Martin Insull, president, Middle West Utilities Company, Chicago, Illinois; Elmer Bliss, president, Regal Shoe Company, Boston, Massachusetts; G. S. Brown, president, Alpha Portland Cement Company, Easton, Pennsylvania, and Harry Scullen, president, Scullen Steel Company, St. Louis, Missouri.

The conference adopted a report declaring that the proper functions of the government were political and not economic. It declared that industrial enterprises already in operation or contemplated by government, municipal, county, state and Federal "are of such magnitude and diversity of character that they are seriously endangering numerous private industries." Continuing, the Conference's report said:

"Government enterprise pays no taxes. When government displaces private business, the loss in taxes as well as the excessive cost of operation is levied upon property and business which survives. The National Defense is best and most economically served by private business enterprises which may be converted to war purposes in case of emergency.

"Government enterprise almost invariably incurs a loss far exceeding any possible profit. These losses constitute an unjustifiable waste of public money. Costs of government are concealed from the public by neglect to employ a system of cost accounting which fully reveals the total expense.

"Government in business drives citizens out of legitimate occupation. It discourages business which is threatened. It squanders the money of the taxpayers, increasing their burdens. It is marked by extravagant delays, public inconvenience and loss. It deludes those engaged in agriculture, industry and commerce with estimates of cost in undertakings for which they must pay, piling up costs in excess of estimates under no responsibility or check.

"Government and industry must be protected against the assaults of those who would destroy both by confusing

the functions of each. The door of opportunity must be kept open.

"We call upon every citizen to take a stand squarely upon the proposition that the American Republic is founded upon the private ownership of property and maintained by the private enterprise of those engaged in gainful occupations."

The conference formally asked that government, whether municipal, county, state or federal, abstain from business in which citizens "may properly and legitimately engage." Every group of those who conduct or serve industry were urged to adopt this policy "as affecting their particular vocations and to join in cooperation among the several groups to establish and maintain it."

The conference outlined plans:

To disseminate among the people correct information as to the extent, cost and results of governmental enterprises.

To urge that in all government operations there be established a recognized and adequate system of cost accounting; and that all existing prohibitions against rewarding labor on merit and efficiency be abandoned.

To inform the people that government in business means the establishment of a socialistic state and the ultimate destruction of all individual opportunity.

To oppose every existing or proposed intrusion by government into the proper field of private enterprise.

The membership of the Conference was cited as being composed of the following three classes: trade association, business and professional organizations, and companies or individuals whose interests are or may be directly affected.

During the course of the conference, more than half the members of the conference indicated the penetrations which state, county, municipal and federal agencies have made into their fields of activity and outlined the tendency toward further intrusions.

William B. Ferguson, spokesman for the shipbuilding and ship repair industry and Edwin H. Duff, representing the American Steamship Owners' Association, addressed the conference. Mr. Ferguson flayed the lack of uniformity of management in American navy yards, while Mr. Duff offered his organization's hearty support in getting the government out of the shipping business.

Mr. Ferguson gave concrete illustrations of private shipyards outbidding those of the federal government on construction and ship repair work. He said his criticisms of governmental competition in his field were based on a report made by the Paymaster General of the Navy to Congress in which "fictitious figures" were used by the Navy Department in estimating overhead charges.

Mr. Ferguson in his analyses of government costs in navy yards as compared with private ship yards declared that "It is from 20 to 50 per cent cheaper to do work in a private yard than in a government yard." He also gave specific instances where false economy was practiced by naval officials. Labor costs were higher to the government than to private shipyards, he declared.

The government, he continued, is compelled to change its executive yard personnel frequently and costs of clerical hire were above those of private yards, he declared.

He claimed that the "ever-changing of personnel" in each yard at frequent periods was a handicap to the government in securing quick and efficient service, whereas the American shipbuilder aims to maintain a permanent executive and mechanical force to keep its business on a larger capacity basis than at government yards.

He further said the government had no way to tell of losses and profits but it was his opinion that the losses would amount to countless millions over a period of years. He pointed out one specific instance where the overhead charges should have been placed at 150 per cent instead of 35 or 40 per cent as reported by the Navy Department.

Mr. Ferguson further criticized the government in that it has no responsibility to shoulder in the event "a particular job runs over its estimate," unless it be "the penalizing of its taxpayers."

In referring further to wages paid to government shipyard workers, Mr. Ferguson declared that the average hourly rate in government shipyards was 20 per cent more than in private yards.

This Conference on Government in Industry was a commendable endeavor. Let us hope that when the next conference is called that the trade associations in the non-metallic mineral industries will be represented.

Developing A Remarkable Institution The Greatest of Its Kind

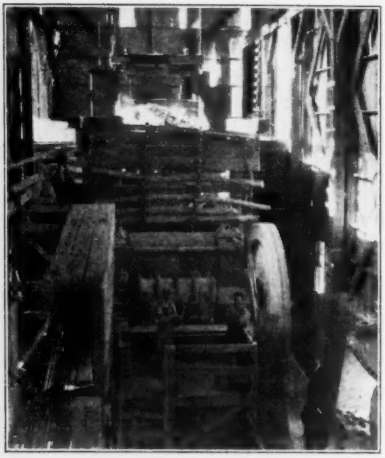
By E. D. Roberts

Part I

STARTING with practically nothing and in ten years owning and operating the largest building materials company in the world is the remarkable record of one man. The man is William C. Hay and the company is the Blue Diamond Materials Company, producers, manufacturers and distributors on a tremendous scale. Ten years ago W. C. Hay found himself in possession of a lease on a large deposit of sand in the City of Los Angeles. Competition was keen and Mr. Hay was not then in a position to install equipment to produce material on a scale which would make operations profitable. Still he had to make a go of it. His first move was to make a ready mixed lime mortar which would help dispose of a large percentage of his sand. If a product could be made better than anything else obtainable, a good price was assured. Why couldn't a superior mortar be made with mechanical labor saving machinery and scientific mix-

W. C. Hay

Long Shot of Mill and Quarry

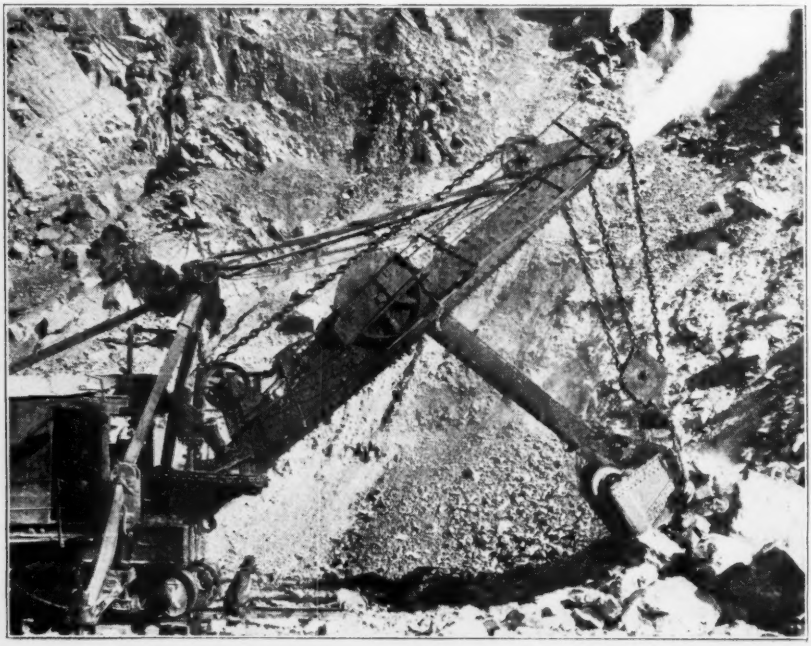


Primary Jaw Crusher

ing methods was the question that presented itself. Mr. Hay proved that it could and in doing so he built an organization which today has branches in San Francisco, Oakland, Fresno, Glendale, Kansas City, Cleveland, Philadelphia, Boston and Montreal. The main organization at Los Angeles has eleven major departments, employs approximately 700 people and has assets in excess of $5,000,000.

The first equipment was a hand mixing box, a hoe and a two horse wagon for delivering the mortar. The only labor was an old negro who quit because he was sure the idea wouldn't work. Mr. Hay kept on and soon perfected machinery which produced the mortar economically and scientifically. As a result of this work the Blue Diamond Mortar Process was perfected. Basic patents have been granted covering the process in the United States and Canada. The Blue Diamond Materials Company are now producing the hardest rock in the western part of the United States and they also operate the most remarkable gypsum deposit in this country. They operate a large gypsum plaster mill, a lime plant, a gypsum block plant, a crushed stone quarry and a sand and gravel plant.

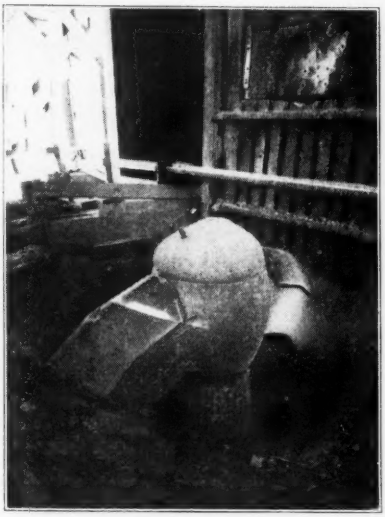
Sand and gravel is obtained from a pit on the property. This pit at the present time is more than 600 feet in width and more than 1,000 feet in length with excavation to a depth of 100 feet. This represents the amount of material used and marketed during the past ten years. The plant has a daily capacity for 24 hours of 2,000 cubic yards of sand and 400 cubic yards of gravel. The deposit is naturally clean and really



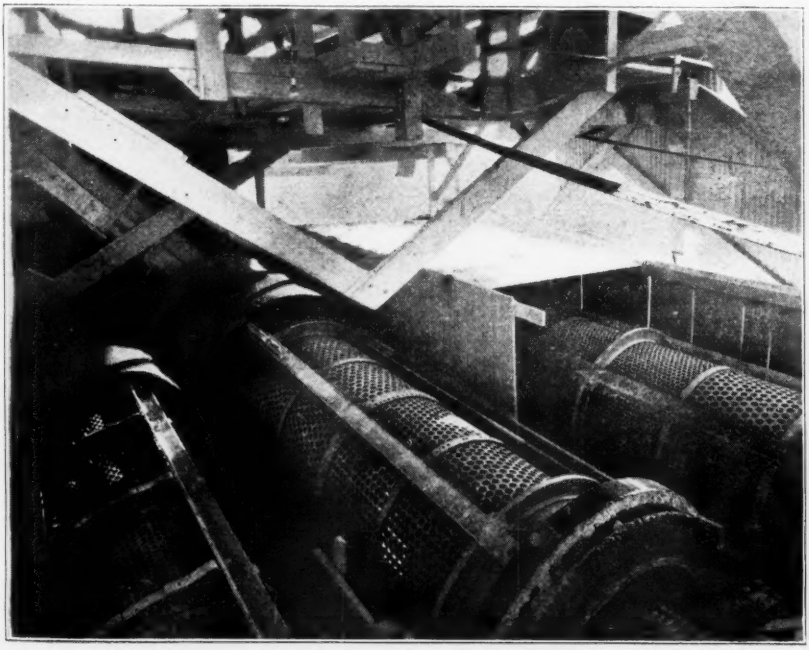
Large Steam Shovel Working on Quarry Floor

does not require washing although the sand used for the ready mixed mortar plant is washed as a precaution and to absolutely insure uniformity and the best product obtainable.

An Osgood crawler type steam shovel with a 1¼ yard bucket is operating in the west end of the pit loading material into a hopper from which it is drawn by a belt conveyor. In the east end of the deposit a number 120 Bucyrus dragline is excavating sand below water level and dumping into a hopper. Water is being encountered at the 100 foot level in the east end of the deposit. American "Crackerjack" belt conveyors 24 inches in width transport this material from the two hoppers to the initial scalping screen. A system of several belt conveyors converge to one belt conveyor which delivers all material to this scalping screen. The oversize passes to a number 2 Austin gyratory crusher and to a number 4 Allis-Chalmers "Gates" crusher. Both crushers discharge to an inclined 36-inch belt conveyor which delivers the material to the sizing screens over the bins. Two sets of Allis-Chalmers screens, one 48 inches by 16 feet and the other a 36 inch by 12 feet, separate out ½, 1 and 1½ inch material. Belt conveyors transport the material from the sand bins to the washer and from the washer to the mixed mortar supply bin. In the transportation of sand and gravel 3,800 feet of 24-inch American belting is used. A Byers caterpillar locomotive crane reclaims the sand and



Gyratory Crusher at Corona Plant



Sorting Screens Over Loading Bunker

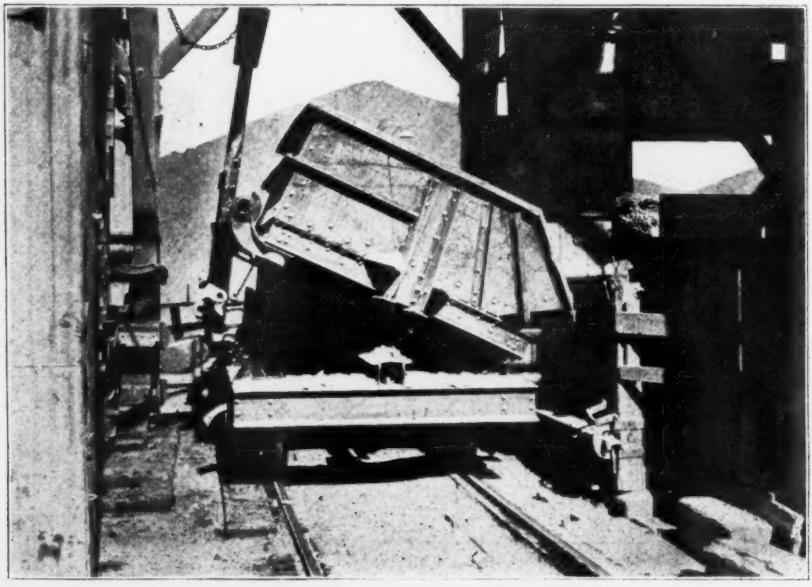
General View of Mill, Railroad Loading Banker and Aerial Tramway Tower

gravel from ground storage and loading into a portable bin. Trucks are loaded for delivery to the job.

After perfecting the mixed mortar process, Mr. Hay enjoyed a rapidly increasing business but found that if he could be in a position to fill more of the needs of the building contractor that he could get business that was going to some other producer due to the fact that some contractors do not care to have too many accounts to handle. The material from the pit ran so high in sand that there was a very small amount of gravel or crushed rock available in comparison to the amount required to enable him to furnish the contractor with sand and gravel for concrete as well as the brick mortar and plaster putty. As a consequence he began to look around for a suitable rock deposit to develop, and in line with his aim in perfecting the Blue Diamond Ready Mixed Mortar process, which was to make it better than any other obtainable, he searched the country over for the best obtainable rock.

Investigation of the requirements for a good concrete aggregate showed that it should be extremely hard and that it should resist high temperatures. Tests on samples of concrete showed that the strength varied with the hardness of the rock, therefore his rock should be the hardest obtainable. Investigations following several large conflagrations, where reinforced concrete buildings were affected, showed that where a good grade of trap rock was used that the concrete work was damaged very slightly.

A particularly fine deposit of trap rock was found in the Temescal Mountains, near Corona, California. This deposit was thrust up in a molten state from underneath against a previously deposited covering of lava. It cooled slowly under great pressure leaving it unstratified, homogenous, intensely hard and of absolutely uniform texture. The de-



Dumping Rock Cars Into Primary Jaw Crusher

posit was purchased by the Blue Diamond Materials Company after prospecting many other deposits in order that they might have the finest possible aggregate for concrete obtainable in the Southwest.

The development of the deposit required the construction of ten miles of standard gauge railroad from Corona, a station of the Santa Fe Railroad. Plans for the crushing plant called for the quarry floor to be high enough on the hillside, or 185 above top of rails, to take advantage of gravity in passing the material from the quarry to the railroad cars. A good idea of how this was done can be gained by inspecting several of the illustrations accompanying this article. Production was started a little over five years ago with a complete quarrying and crushing and screening plant. Additions have been made continuously since until today the plant will produce 5,000 tons of crushed rock in two shifts.

A 100 ton Marion steam shovel with a 4 yard bucket loads the rock into specially constructed 7 ton steel cars. These cars, made in the Blue Diamond machine shop, are hauled to the primary crusher by two Davenport saddle tank locomotives in trains of five cars each. An auxiliary number 37B Marion crawler type steam shovel is used when the occasion demands it.

Clam Bucket of Aerial Tramway, Railway at Left

The steel cars side dump the rock directly into the jaws of an Allis-Chalmers jaw crusher with a receiving opening 66x84 inches. The crusher is lined with manganese steel liners and is capable of reducing 1,000 tons of rock per hour to a 10 inch size, which is discharged into a large bin or hoper directly beneath. An electrically operated gate controls the flow of the rock from the hopper onto an inclined grizzly which chutes the larger sized rocks into a number 9 Allis-Chalmers gyratory crusher, while the smaller pieces fall through

Rock Train on Trestle After Dumping Into Primary Crusher

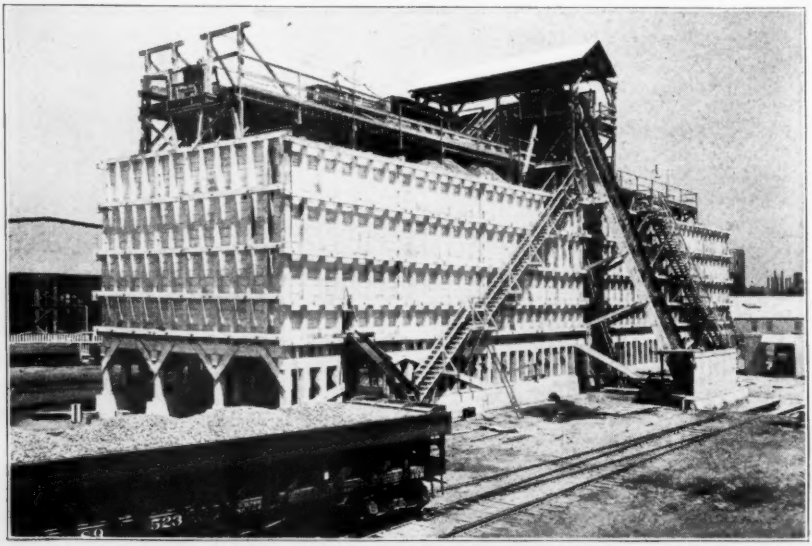
Portable Loading Bunkers

the grizzly into a hopper. This hopper discharges the material onto a 36 inch belt conveyor operating under the number 9 crusher. This conveyor takes the material passing the grizzly and that given the secondary crushing and discharges it into a large storage bin for further reduction later.

Two automatic American Manganese Steel Company feeders draw off the crushed rock from the primary storage bin and feed it to the scalping screens. There are two 60 inch by 16 feet and two 48 inch by 20 feet scalping screens arranged so that two screens take the output of one feeder. A 30 h.p. motor operates each feeder and its pair of screens as a unit. The rock passing the screen drops down through a chute to a 36 inch belt which takes the discharge from the final reduction crushers while the oversize rock falls into a feed bin for the reduction crushers.

There are six reduction crushers set in a row and arranged to draw from the feed bin and discharge onto the 36 inch belt which conveys the crushed rock to the sizing screens. Three of these crushers are 48 inch Symons disc, one a 24 inch Symons disc and two are 6 inch Allis-Chalmers reduction crushers.

The 36 inch American "Crackerjack" belt conveyor belt, traveling at 300 feet per minute, discharges the crushed rock into a chute which controls the flow to either or both of the primary sorting screens. These screens reject the material over 2 inches in size and discharge it onto an inclined 24 inch belt which carries the rejects back and discharges into one of the 6 inch Allis-Chalmers crushers for final reduction. The material passing the primary sorting screens now cascades down over a total of 18 Hummer screens arranged four abreast except at the last where two are placed abreast. The first set of screens takes out the 1½ to 2 inch rock, the next set eliminates the 1 to 1½ inch rock, the next set picks out the ¾ to 1 inch rock, the next and last set of four screens sorts out the ½ to ¾ inch rock while the last set of two screens separates the ⅛



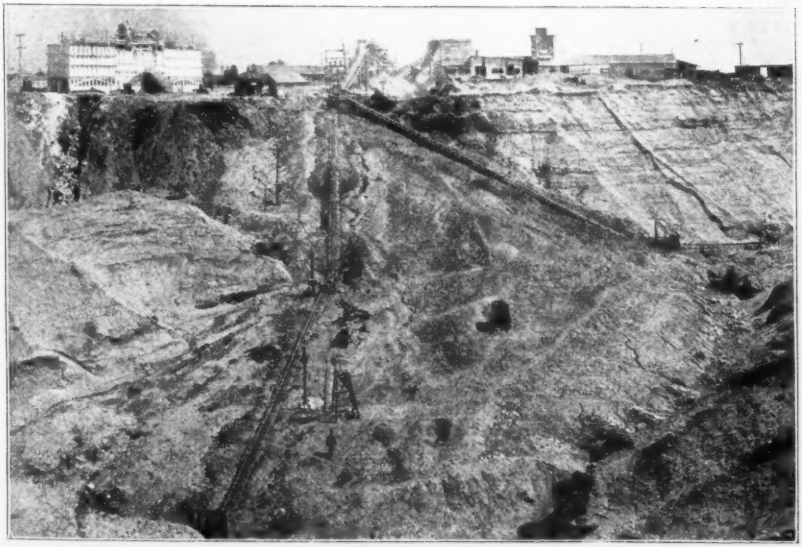
Six Thousand Ton Trap Rock Bunker

to ½ inch rock from the dust. Each size passes down chutes leading into the bins for that sized material or onto one of the two 75 foot shuttle conveyors which distribute the rock along the bins, while the dust falls directly into its bin below. Two sets of Sly dust collectors with outlets at the crushers and screens discharge into this same dust bin. This dust has a commercial value for asphalt filler and other uses.

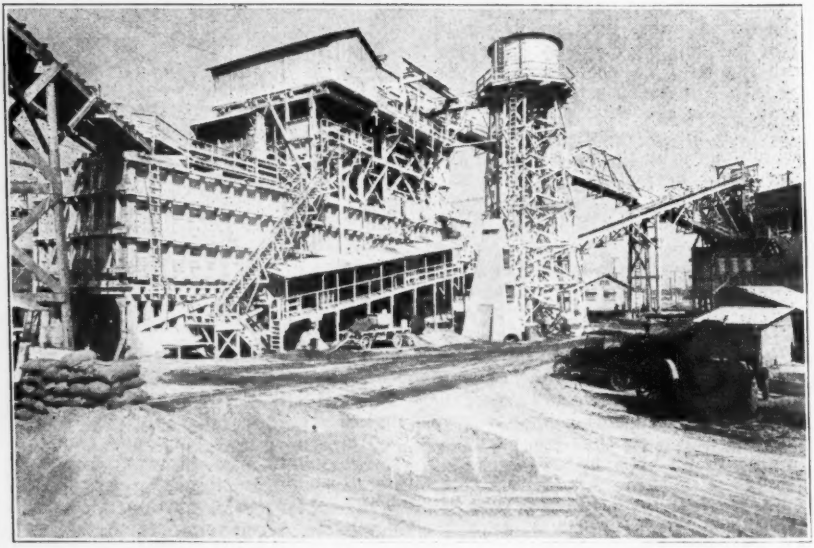
The shipping bin has a capacity for 6,000 tons of crushed rock and is built so that cars on two tracks can be loaded at once by spouts leading from the bin bottoms. A conveyor is installed along the back side of the shipping bin to draw off the rock for outside storage in case shipments are not keeping up with the quarry production. This belt conveyor discharges onto a pile underneath a large Interstate Equipment aerial cableway system for ground storage and reclamation. There are two towers, one a fixed tower 135 feet high at the conveyor discharge and the other a movable system traveling on a track having a radius of 800 feet with its center at the fixed tower. The rock is carried out and back by a 2½ yard Hayward bucket traveling on a 2½ inch single lock span cable at the rate of 1,250 feet per minute. This system provides for the ground storage of 200,000 tons of crushed rock, which is reclaimed by the same bucket and dropped into a hopper feeding to a belt conveyor that discharges onto the shuttle conveyors over the shipping bins for distribution to the proper bin. A most remarkable aerial tramway system for handling gypsum will be discussed in the second part of this article.

One of the Sand Tunnels

Several special features of the plant require attention. There is a 10,000 gallon water system for softening the water for plant use. Three Gould triplex pumps are in use, two for handling water to the large storage tank above the plant and the other raises oil from the tank cars on the track level to the oil storage tank also on the hill. Oil is the fuel used in the steam shovels, locomo-



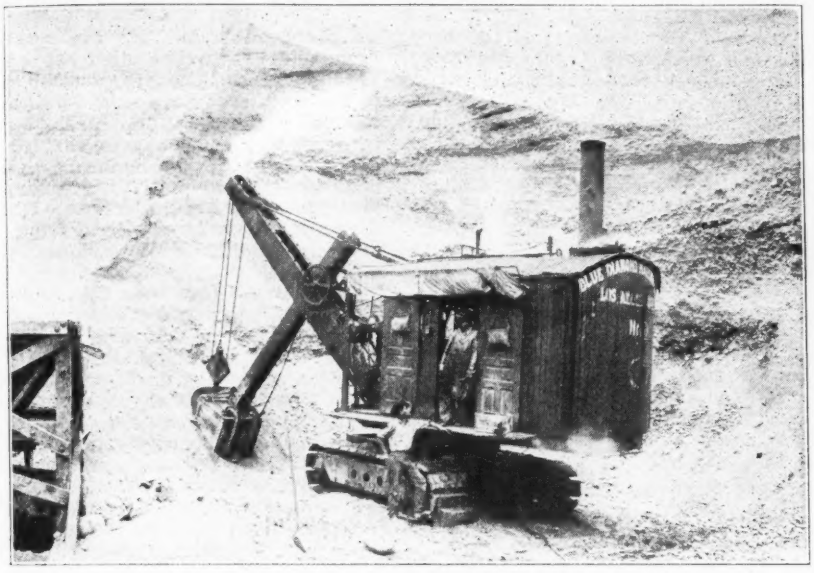
General View of Sand Pit 1,000 Feet Long, 600 Feet Wide, 100 Feet Deep



Sand and Gravel Washing Plant

tives, and power house. A large Chicago Pneumatic air compressor furnishes compressed air for drilling and plant use at the rate of 900 cubic feet per minute. There is a 40x90 foot machine shop that will handle a 44 inch piece. A 40x50 foot warehouse is provided for supplies, etc. In the power house there are 4 General Electric direct current generators that furnish power for operating the Hummer screens, the large 50 ton crane operating over the heavy machinery, and for the Interstate aerial cable-

Plant Machine Shop

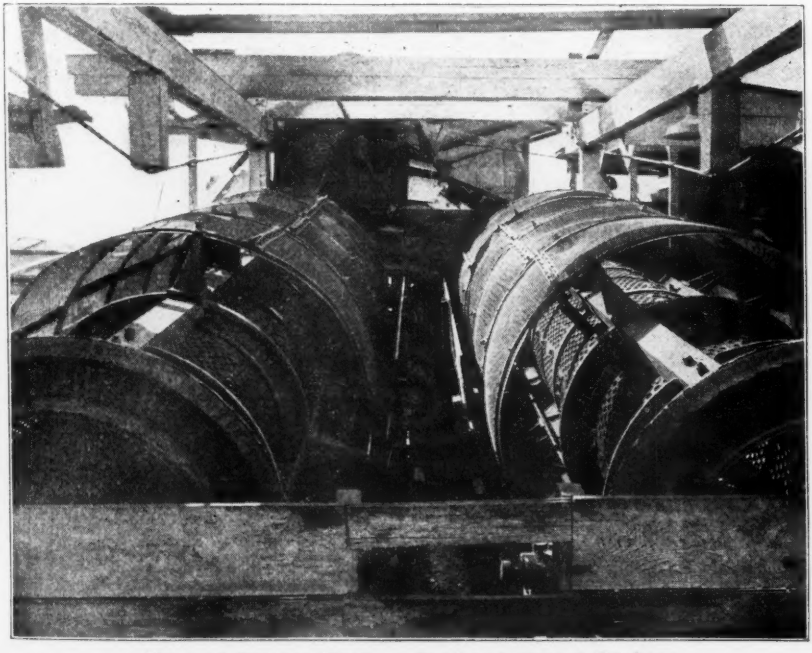


Shovel Used to Load Sand on Belt Conveyors

way. One belt in this plant has handled over 8,000,000 tons of rock in five years and is still in service.

Mr. George Haines, the quarry and plant superintendent, as well as Mr. John Schriner, the Blue Diamond Material Company's production manager who built the plant are very proud of it and are constantly on the lookout for ways to increase production.

The crushed rock is shipped in commercial bottom dump cars over the



Type of Screens Used on Sand and Gravel Bunkers

Sante Fe Railroad Company's tracks to the Los Angeles plant of the Blue Diamond Materials Company where it is placed in the distributing bunkers. The cars are spotted over a sunken reinforced concrete track hopper and the rock dumped into the hopper. An inclined bucket elevator, using 30 inch bucket, raises the material from the track hopper and discharges it onto a shuttle conveyor that distributes the rock to the proper bins. This bunker, the largest distribution bunker west of Chicago, will hold 6,000 tons of crushed rock. It is constructed of wood with reinforced concrete foundations. Three runways are provided under the bunkers for the passage of trucks while loading with rock. A double unit Sly dust collector draws the dust out of the rock during its handling from car to bin.

The crushed rock as well as the mixed mortar and many other products of the Blue Diamond Company are distributed to the consumers in Los Angeles by a fleet of 107 large trucks. The company owns outright 70 of these trucks, lately adding a unit of fourteen. Most of the trucks are Diamond T of special order for the Blue Diamond Company. The six wheel truck has come into favor with the Company and late additions are of this type.

In the Blue Diamond Mortar Process the lump lime is fed to an automatic Hay hydrator, a machine developed by Mr. Hay. This machine has a capacity of one ton per batch. The machine itself regulates the amount of water to be added while the lime is being stirred violently. After a mixing of 15 minutes the slaked lime now in a creamy state is discharged through screens into large vats as putty. Eight vats each 8x8x 45 feet are so placed that the slaked lime will flow from the hydrator into the vats. The putty is allowed to remain in these vats for curing for a period of five or six days. At the end of the curing process the putty is mechanically agitated to a creamy state by one of two aerators traveling on a track, the rails of which are placed alongside the vats. The aerators are made up of vertical motors direct connected to a vertical shaft turning a paddle in the putty at the rate of 2,500 r.p.m. The whole unit is mounted on a frame. A Yale and Towne triplex block operating on an overhead track lifts the aerators from one vat to the other when the aeration of the one vat is completed.

From these vats the putty is pumped through a three inch pipe to large cylindrical tanks in the top of the mixing room. The sand has also been brought to and discharged into bins alongside the putty vats. Screw conveyors draw off the sand from the bins and feed it into a hoe blade mixer while at the same time automatic valves draw off the required amount of putty and discharge it into the mixer. The valves and screw feeds are synchronized so that the mix will always be uniform. The hoe blade mixer is another development of Mr. Hay's and is really a special screw conveyor operating in a trough.

The mixers discharge the mortar into 8 yard hoppers located at the proper height for gravity loading into trucks which transport the mortar to the job. At present there are two mixing units and hoppers, and a third is now being installed. Each machine will turn out 200 cubic yards of mortar on one shift.

A fleet of trucks delivers this mixed mortar directly to the place where it is to be used, and at present 90 per cent of the mortar used in Los Angeles comes from the Blue Diamond plant in this manner.

Ready slaked lime putty specially cured for plastering is also prepared in this section of the plant. It is mixed in the same hydrating machine in which the other putty is hydrated but is screened through a finer mesh screen and piped into air tight storage vats where it is allowed to cure 30 days. When ready for shipment it is drawn off into steel barrels holding 250 pounds of putty. It will keep indefinitely in these containers when properly covered. The putty is shipped to the job in these containers where it is mixed with sand just before application to the walls.

Credit is allowed for return of the empty barrels which are cleaned by a Handy cleaner before being used again. This cleaner is a revolving brush which is applied to the dirt accumulations.

In the next article, which will take up the gypsum operations of the Blue Diamond Materials Company, the most daring undertaking in the history of the Gypsum Industry will be described.

Simplicity and Flexibility Evident In This Sand and Gravel Plant

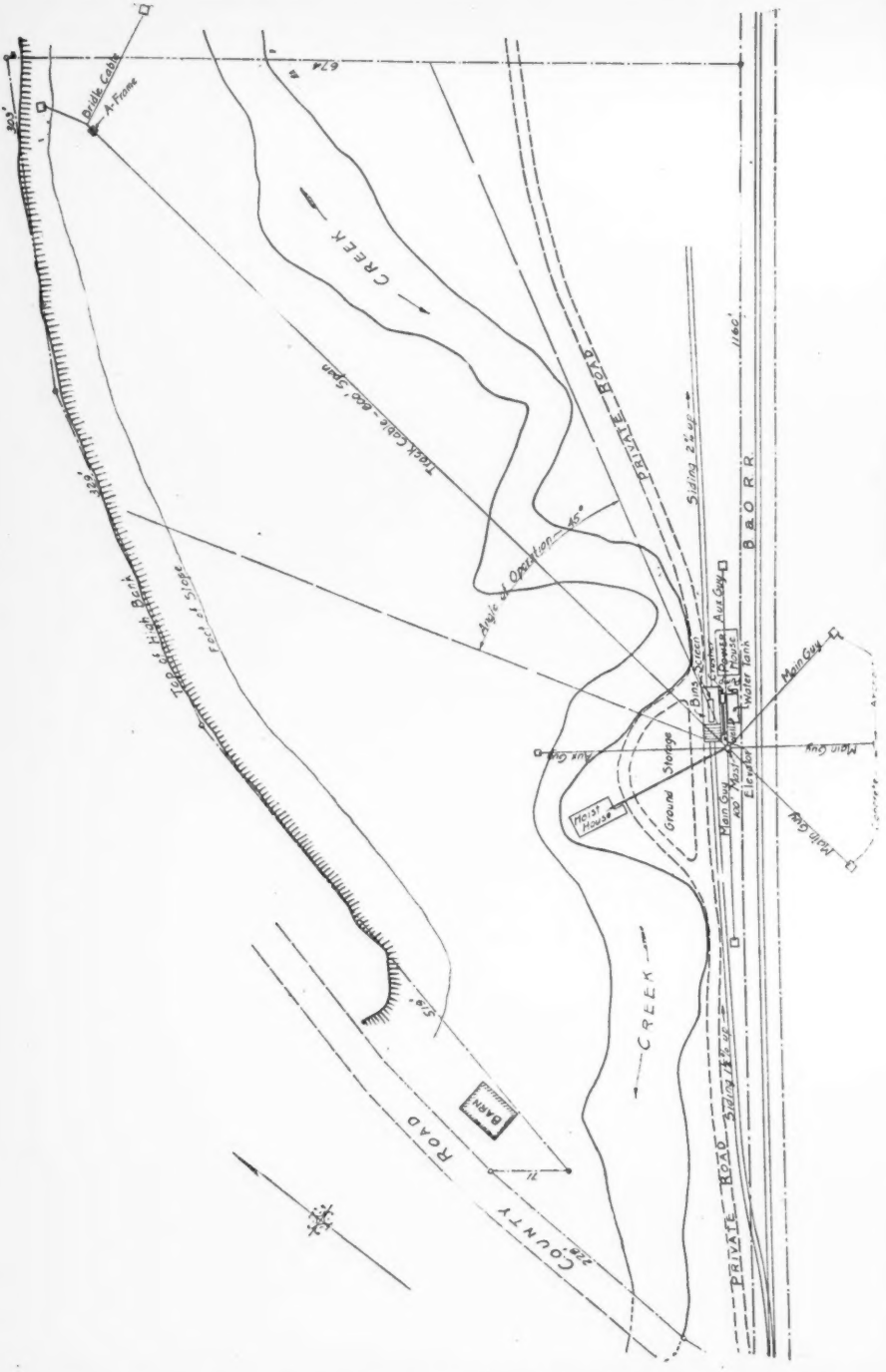
MODERN methods and efficient equipment have been utilized by the Midway Sand and Gravel Company in its new plant located at Gravel Bank, Washington County, Ohio. This new plant is located midway between Parkersburg, West Virginia, and Marietta, Ohio, on the Baltimore and Ohio Railroad and far enough back from the Ohio River to avoid delays due to high water.

More than forty years ago the Baltimore and Ohio Railroad used this same pit for securing ballast. This early operation was carried on for only a short time; in fact, only the surface of the pit was removed. Why this deposit was overlooked is not known. The material is very high grade and the pit runs deep. The present organization completed the new plant and started operations last August.

The scarcity of water at the plant site called for special consideration. To supply sufficient water it was necessary to drill on the property close to the proposed washing and screening plant. A Sullivan 500-gallon air lift pump was installed to bring the water to the surface, and a Gould 4-inch centrifugal pump was installed to lift the water to the top of the plant. The water delivered by the air-lift pump is stored in a 15,000 gallon tank, and from this tank is delivered to the top of the washing plant by the centrifugal pump. The concrete water tank is 8 feet high with the bottom 4 feet below the ground line. The centrifugal pump is located at ground level so that the surface of the water in the tank is above the pump which keeps the pump always primed. The pump drive is not provided with a clutch as the pump is shut down by simply closing a gate valve on the discharge line near the pump. A Sullivan 11x10 inch single stage air compressor operates the pumping equipments. This arrangement is flexible as more wells can be drilled if necessary and the one compressor can operate the additional pumping units.

The washing, screening and storage units were so located that a railroad siding was placed with 400 feet of track at either end of the plant to accommodate a storage of 10 cars. This siding was designed with a 1½ per cent grade from the switch to the bins and a 2 per cent grade from the bins to the dead end. These grades facilitate the movement of empty cars to the bins and the loaded cars from the bins toward the switch. The cars are shifted at least once a

Approaching the Plant from the Railroad Tracks

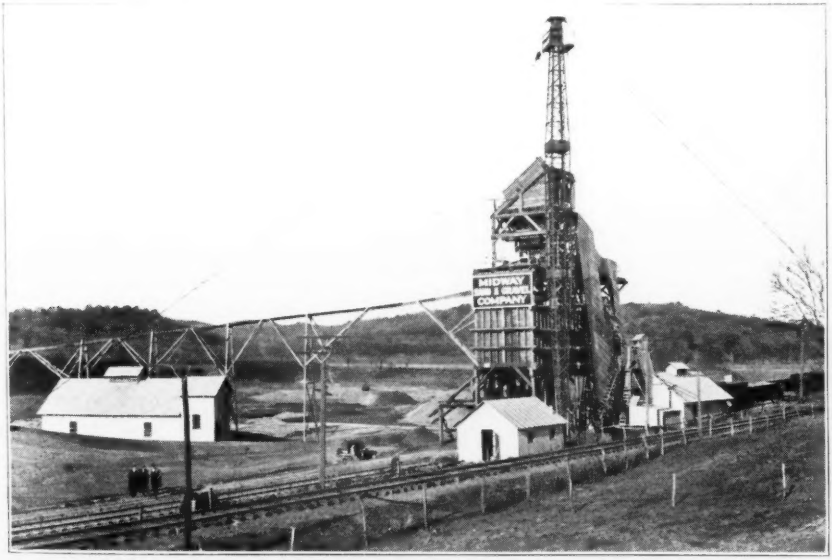


Layout of the Midway Sand & Gravel Company's Plant at Gravel Bank, Ohio

Close-Up of the Cableway Bucket

Screening, Washing and Storage Plant

day. The train of empties is pushed up the siding above the bins, and it is not necessary for the engine to pass under the bin structure. The cars are cut loose one at a time and travel down by gravity to the loading point. After loading, the cars travel by gravity towards the switch for storage until pulled out by the switching engine. Flexibility in design is in evidence also at this point as a second siding parallel to the



The Completed Plant

first can be installed if the plant capacity should be increased to more than 10 cars a day.

The material is excavated by a Sauerman slackline cableway of 1½ yard capacity and with an 800 foot span. This cableway was designed to have an angle of operation of 45 degrees. A 100-foot steel mast gives sufficient dumping clearance over the grizzly and provides sufficient grade for the track cable to take the empty bucket back to the tail. A frame after a small amount of excavation has been made. All the anchors for the main mast guys and the tail bridle are 7 foot concrete block cubes weighing over 25 tons with railroad rail reinforcement and 2½-inch U bolts for connecting the guys. One of the auxiliary guy anchors is a 5-foot cube, while the other is 7 foot and it was used in raising the mast which meant a pull on the anchor greater than that from ordinary operation of the cableway. The U bolts extend diagonally through the block from the top front corner to the rear bottom corner. All guys are provided with thimble sheaves and shackles for convenient attachment to the anchors for tensioning. The four main guys are 1⅜-inch cable and the auxiliary guys are 1-inch cable. The track and bridle cables are also 1⅜-inch.

A Sauerman belt driven hoist operated by a 100-h.p. Bruce Macbeth gasoline engine completes the excavating unit. This hoist is located 100 feet from the mast instead of the usual 120 feet because of the lack of room. A natural gas main crosses the plant property and made it possible to secure fuel conveniently and economically.

The cableway bucket discharges onto a 20x20 foot grizzly made up of railroad rails. This grizzly is directly over a dump hopper which is 66 feet from the ground. The material is fed from the dump hopper to the wash box uniformly by a Telsmith 20 inch by 5 foot automatic reciprocating plate feeder. The oversize is chuted to a 9x16 inch Telsmith jaw crusher with an adjustable bottom opening from 1¼ to 1¾ inches. The discharge from the crusher is returned to the wash box by a 56-foot centers Telsmith belt bucket elevator. The material from the wash box passes through a 40-inch by 18-foot heavy duty Telsmith washing screen. This screen consists of a 5-foot scrubber section, a 6-foot screen section with ¾ inch round perforations, a 4-foot screen section with 1½ inch round perforations, a 3 foot screen section with 2½ inch round perforations, and a 5 foot auxiliary sand jacket with 1¼ inch slots. The final separation of the sand takes place in a Telsmith automatic tilting sand separating tank. The crushing, washing and screening plant is operated by a 150 h.p. Bruce Macbeth gasoline engine. The following sizes are produced sand up to ¼ inch; fine gravel from ¼ to ¾ inch; medium gravel from ¾ to 1¼ inches, and coarse gravel from 1¼ to 2½ inches.

The bin structure is of timber on feet in dimensions with separate compartments for the four sizes of material produced. The bin capacity is 500 tons which is sufficient when the ample space for ground storage is considered. These bins are equipped with four 18x18 inch single leaf bottom bin gates for car loading and four 16x14 inch quadrant side bin gates for truck loading. A Sauerman crescent power drag scraper operated by a Fordson driven hoist is used for storing and reclaiming work.

The plant was designed by the Beckwith Machinery Company for a capacity of 10 cars per day. The officers of the Midway Sand and Gravel Company are: E. W. Mallory, president; J. S. Echals, vice-president; Edward O. Bowes, secretary-treasurer and J. L. Williams, general manager.

New Flexible Coupling

A new flexible coupling has been developed by the Poole Engineering and Manufacturing Company. The object of the product is to compensate for the usual unavoidable errors in shaft alignment in all classes of connected machinery and allow free end float for two connected shafts.

The coupling consists of six parts, two hubs, each having an external gear meshing with internal gears on two sleeves which are bolted together, and two aligning rings which are fitted into the two sleeves. The outer faces of the teeth of the hubs are formed spherically which provides a true self aligning bearing for the connecting sleeve. In this way if two shafts are out of alignment the sleeve assumes a neutral position with a perfectly formed and lubricated bearing on the spherical surface of each shaft hub.

The manufacturers claim the coupling operates equally well in either direction, on continuous or reversing service and at high or low speeds.

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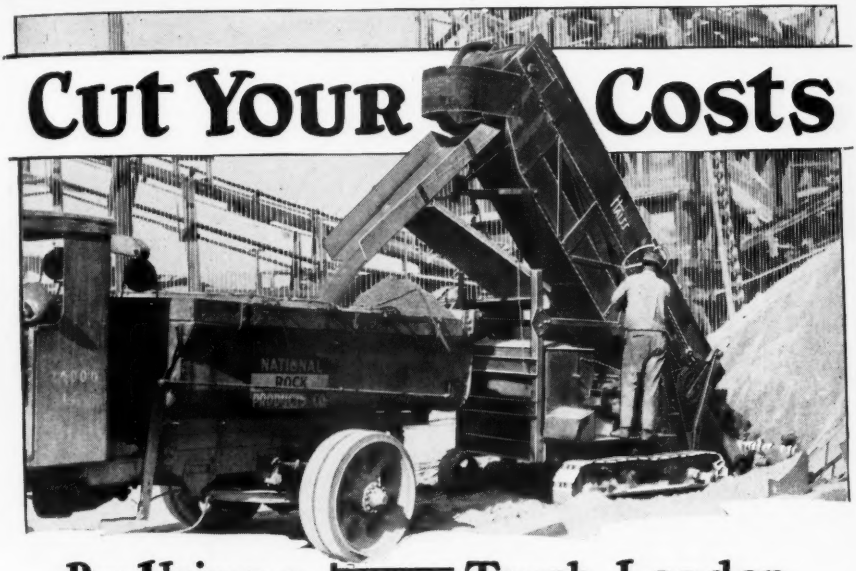

By Using a HAISS Truck Loader

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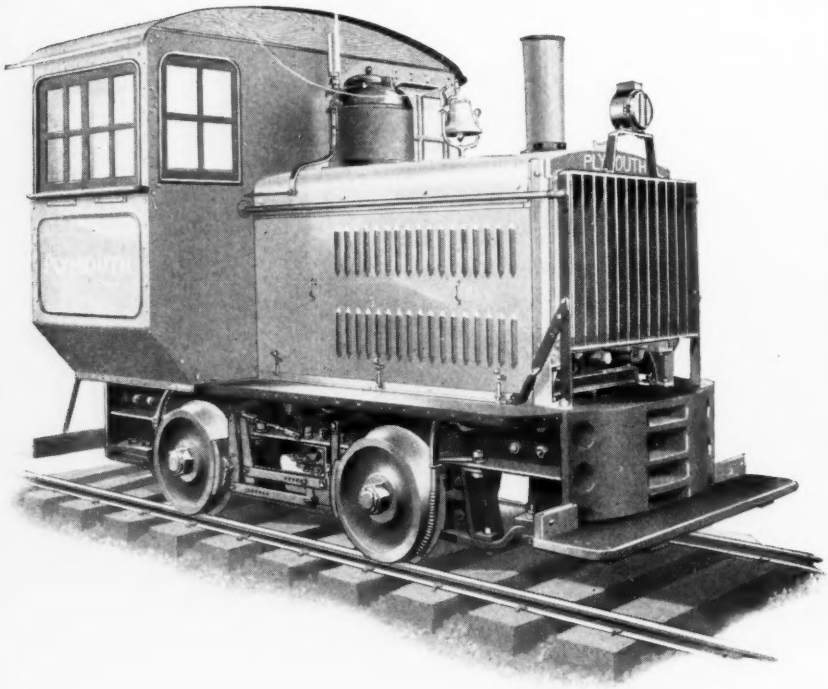

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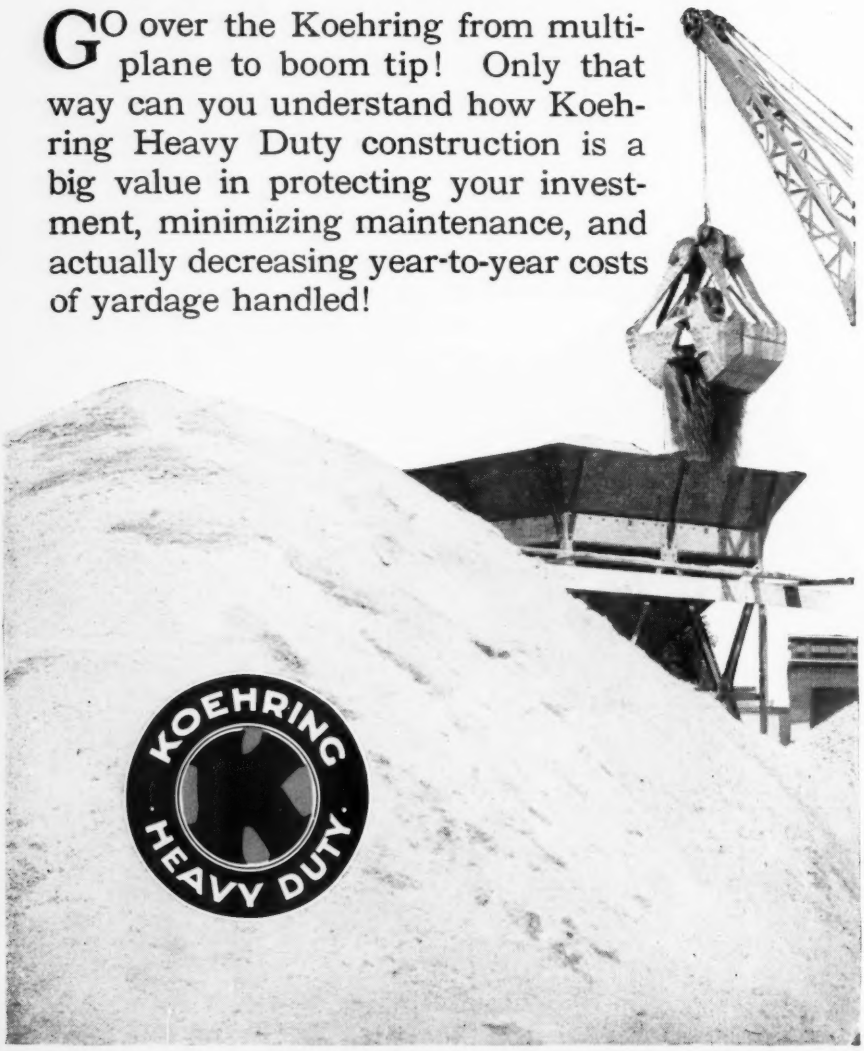

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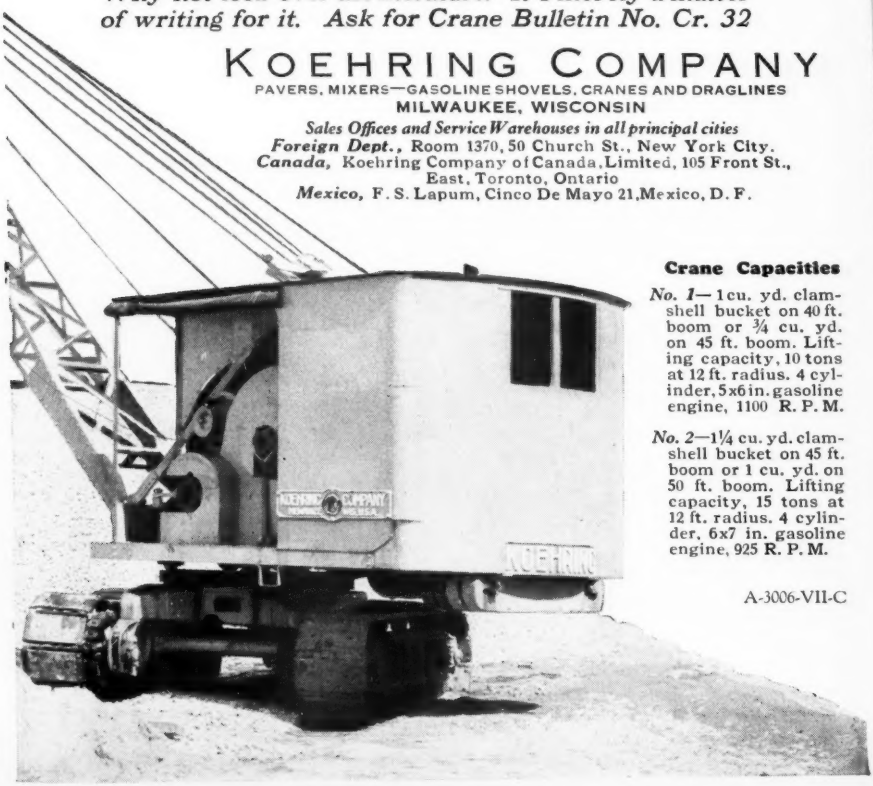

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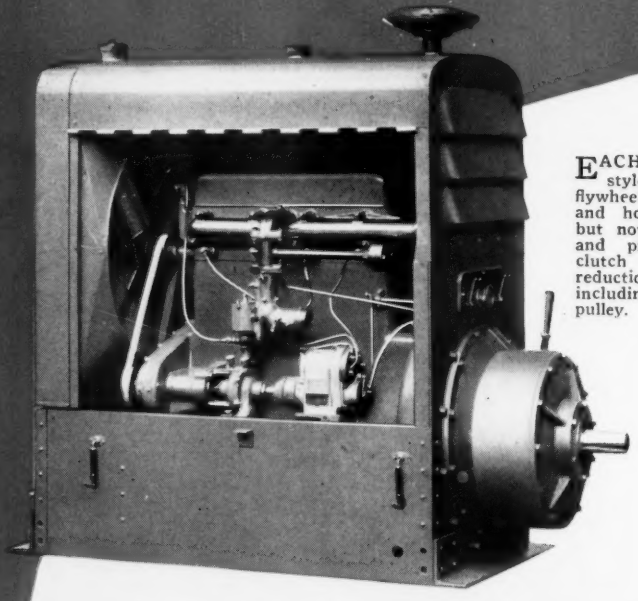

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Applying Efficient Operating Methods In Quarrying Granite

By George Ransom

PROBABLY the most particular feature which renders the Redstone (New Hampshire) quarry of the Maine and New Hampshire Granite Corporation, interesting is the formation of the rock which makes it possible to take out the stone at a low cost. The quarry is located on the side of Rattlesnake mountain where the rock crops out at the surface. By working back into the mountain on a more or less horizontal plane it is unnecessary to make a hole. Thus all pumping and much hoisting are avoided. The face of the quarry is now about eighty feet perpendicularly. The formation consists of series of vertical headings with horizontal bed seams between forming sheets fifteen to thirty feet thick, and these are of such a size and are piled up in such an irregular way that blocks may be taken off along the natural seams without any channelling operations.

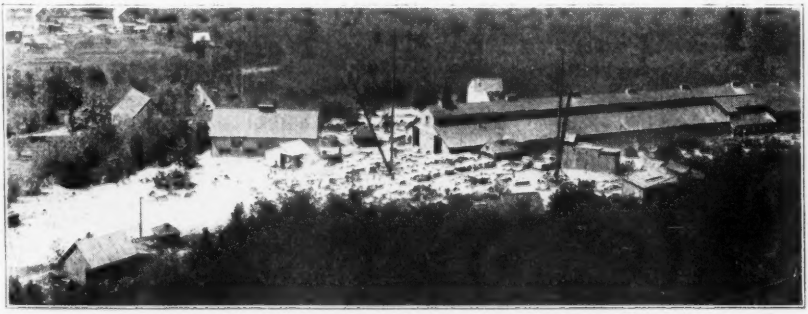
A number of granite blocks 15x5x5 feet were recently prepared from which some of the columns of the Washington Masonic memorial at Alexandria, Va. were to be cut. In some cases, pieces were loosened large enough to make three of these blocks, weighing in the neighborhood of 150 tons. This was done by drilling Lewis holes (series of threeholes) 2½ inches in diameter and 20 feet deep across one end, the other side of the block being defined by the natural seams or cleavage surfaces.

Blasting was done as usual with black powder in several successive charges. The first two or three charges are small and produce only small cracks and after these have appeared a heavy charge is set off which breaks it clear.

The large pieces were broken up into the proper sizes with plug and feather splits. The arrangements for handling these heavy blocks are very simple and ingenious. Two wooden derricks located at strategic points and one steel derrick are used. There is also a 700 foot incline with a 10 per cent grade leading down to the mill and a track extending across the face of the quarry and ending at the top of the incline.

The wooden derricks, of 50 ton capacity and operated by Lidgerwood and Mead-Morrison steam hoists, are used to handle the blocks of stone and place them on trucks which run on the tracks. The truck carrying its block of stone is then pulled by means of one of the hoists to the head of the incline where it is taken off by the steel derrick.

However, before being taken down the incline the block is cut to the rough dimensions required by the mill. In the case of the columns for the Washington Memorial just cited, the corners of the quarry stone are "plugged" which considerably decreases the weight during subsequent handling. Even so these particular pieces weighed 35 tons. Of course where other shapes are concerned the blocks are trimmed in various ways but all surplus material is removed in so far as practicable before the



Bird's Eye View of Mill Looking Down From Quarry

block is taken down the incline. Much of this work is done by means of pneumatic hand tools.

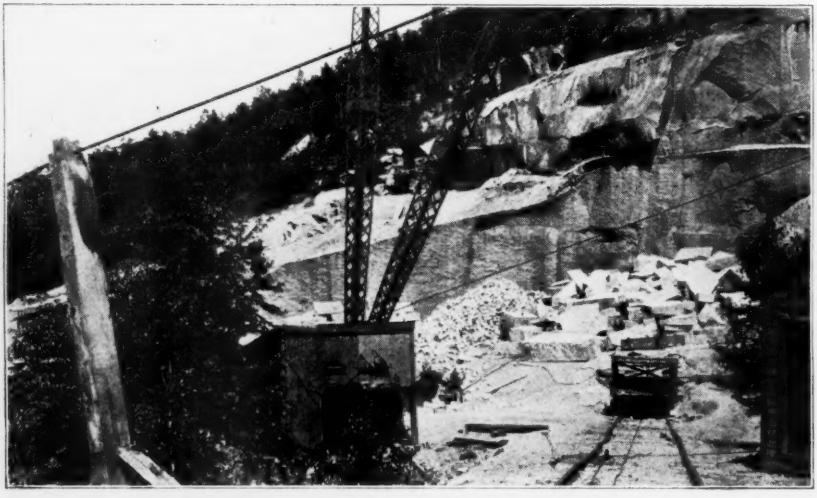
For the disposal of refuse material there are tracks at different points leading out to high dumps. One of these is located conveniently for carrying cuttings from the vicinity of the steel derrick where the quarry blocks are trimmed to rough dimensions and another is near the portion of the quarry which is now being worked. Trucks are used for this and operated by hoisting engines. The construction of these cars is simple and consists of a raised platform at one end of which is pivoted and may be tipped by releasing a chain. The weight of the block to be disposed of is counter-balanced by a block of sufficient weight which remains permanently in place.

When the blocks of granite are ready to be taken down to the mill they are placed on the truck operating on the incline by means of the steel derrick. This truck of course descends the incline by gravity and is controlled by a cable passing around a brake drum. The descending loaded car pulls up an emptv on the parallel track. Sometimes they bring back supplies such as a load of coal.

The foregoing description of the methods of handling materials applies to the larger of the two quarries, which is the one from which the pink granite is obtained. There is another smaller quarry adjacent to this from which green granite is obtained. The two are separated by only a narrow strip of decomposed rock. This quarry also has its incline to the mill, although it is only a single track affair, but the same general scheme of trimming the blocks to their rough dimensions before lowering is followed. The formation of flat bed sheets and vertical headings is similar in both quarries.

All operations in the quarry, which actually mean hoisting or pulling by means of hoisting engines, are by steam. These quarries were started about 40 years ago and they have been under the same superintendent, Ralph L. Crockett, about ten years. Electrical power has been available only during the last few years. As soon as Mr. Crockett took charge he saw to it that all machinery was brought up to date and was efficient in all respects, and as he has carefully maintained it ever since, he has not yet felt justified in replacing it by electrically driven equipment.

As replacements become necessary through natural wear and tear electric drive will be substituted for steam; but in the meantime Mr. Crockett is conservative enough to feel that the business for which he is responsible should not be burdened with the increased investment which such a wholesale change would entail. The time will eventually come when the maintenance of the old equipment will justify this but at present everything within reason is being done to prolong the useful and economical life of the existing machinery.



End of Tracks Across Quarry Face and Derrick

A noteworthy fact, which is only too frequently conspicious by its absence, is the neat appearance of the quarry and the buildings housing the hoisting apparatus. The latter, as well as all derricks, are painted a dull red and look as though this had been done recently. The cost involved is not important and the effect on visitors is pleasing in comparison to some of the miserable tumble down shanties one sees in some quarries. Furthermore the effect on the morale of the men cannot but be beneficial, not to mention the preservation of buildings and machinery which must also result.

The outstanding feature of the mill is that it has no travelling cranes and yet it handles large pieces of stone. The main shed was erected forty years ago or more and at that time the principle owner was a railroad man who had car sheds in mind, and consequently followed the same general plan in designing the granite shed. This type of building is not suitable for travelling cranes and rather than go to the expense of rebuilding it other means of handling materials have been developed. The way this has been accomplished has been by very carefully placing derricks with reference to machinery, and vice versa, and by the use of home made locomotive cranes, or "Dagoes."

Locating Derricks and Machines

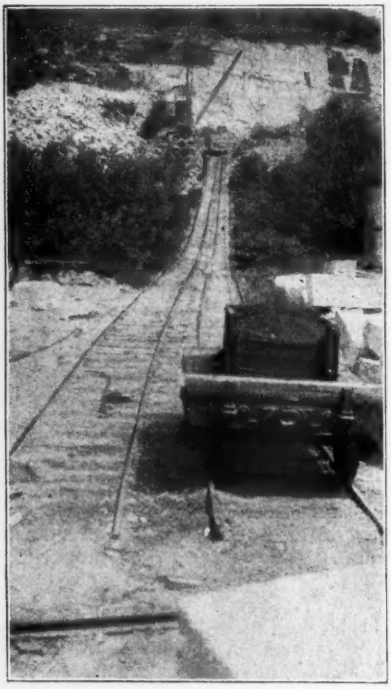
Looking down from the Quarry one can see the mill stretched out at the bottom of the hill. The original shed is a long buiding in which the hand carving, polishing, etc. is carried on. Back of it are the compressor and boiler plants and the yard for loading finished products on to freight cars.

In front of the main building are two 50 ton, steam operated, derricks. One is so situated it can lift blocks from the incline trucks at the bottom of the slope from both of the quarrys and place them in the storage space or in two machines. The house for the cutting lathe is just back of this derrick and slightly to the right. It has double doors facing the derrick and a door in the roof so that stones may be placed on this machine directly by the derrick. The house for the polishing lathe is similarly constructed and is situated somewhat to the right of the house for the cutting lathe and of course facing the derrick.

The left hand derrick of the two is so placed that it can pick up stones from the one at the right and place them on trucks running on tracks extending out from the gang saw house, the carborundum cutter house, and within reach of the locomotive cranes which run the full length of the main shed. The gang saw house is the comparatively large building to the left of the main shed and the carborundum cutter is in the small house directly in front of the latter. To the left of this derrick are located the outdoor rough surfacing machines which are also served by it.

These derricks are operated by

Formation of Pink Granite Showing Natural Fissures



Incline from Quarry to Mill

Lidgerwood and Mead-Morrison machinery.

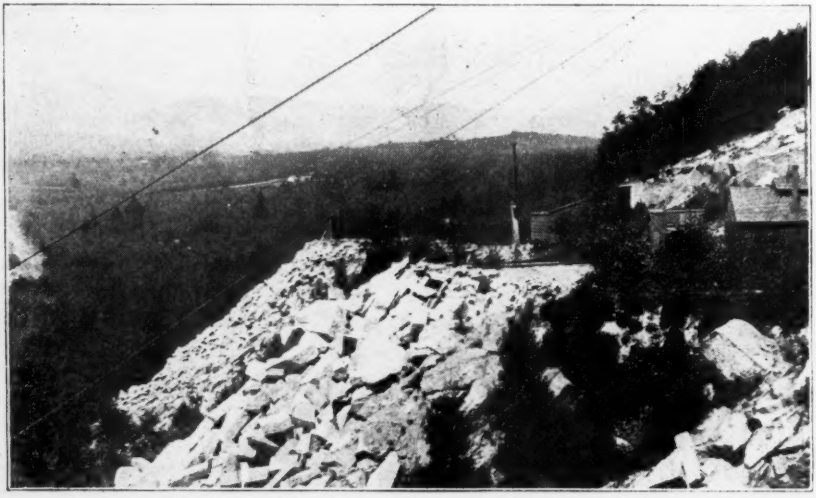
Locomotive Cranes

It will thus be seen that these two derricks can handle all blocks brought down on the incline and place them on the proper machines or within reach of the locomotive cranes which take them into the long shed.

There are two large doors at the end of this long shed, one on each side. There are two standard gauge tracks on each side of the shed on each of which a locomotive crane operates. These two tracks are close enough to each other so that the boom of either crane will reach approximately half way across the intervening space. The space on the outside of the tracks is narrow and is used largely for hand and pneumatic tool work.

The tracks extend the full length of the shed and out into the yard in back where the freight cars are loaded. At the rear end of this building are large polished beds and comparatively small lathes, also served by the dagoe. They are home made and constructed of solid oak timbers. The end away from the crane may be clamped to the tracks when necessary to prevent its tipping. Power is supplied by a steam Lidgerfood hoisting engine which is arranged to propel the locomotive itself. It may be objected that this steam operation pollutes the atmosphere of the shed. This is not the case in summer when everything is open and even in winter it is not serious as openings in the roof are provided for the locomotive to stand under.

The dagoe is a very useful machine. It is used not only to handle heavy blocks of stone weighing as much as 25 tons as already described but, being suited to standard gauge track, it



Tracks Leading Out of Dumps on Mountain Side

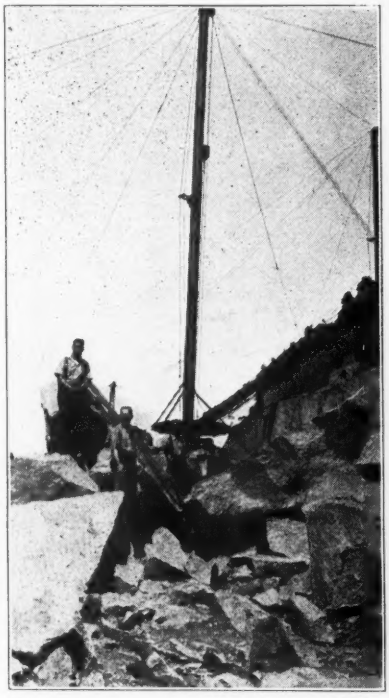
is also used as a shifting engine for freight cars.

In the freight yard there are a number of 25 ton derricks for loading freight cars and otherwise handling blocks of stone during crating or for shipment. Thus it is evident, from the foregoing as wel as from which follows, that the old shed can still be used and that expensive traveling cranes and elaborate craneways can be dispensed with. While this might not be good practice in a new plant it is economical and justifiable under the conditions existing here.

Machinery

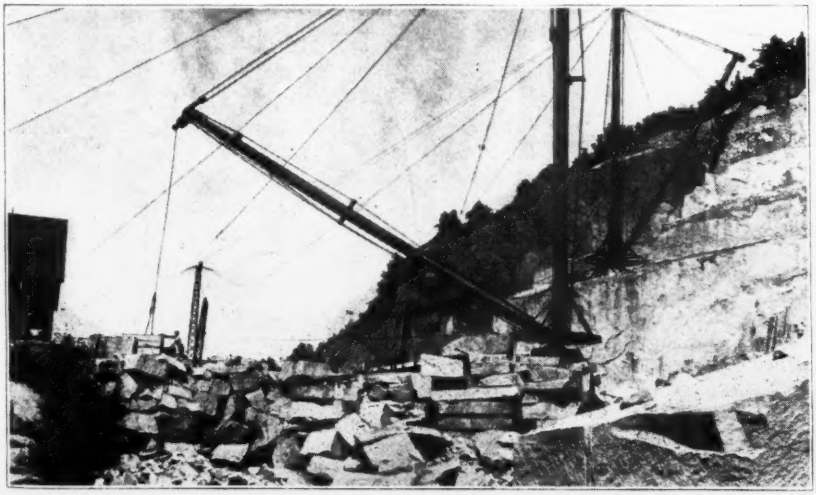
Compressed air is supplied by two compressors made by the Chicago Pneumatic Tool Company. One of these is an 1,100 foot, 22x16 machine driven by a 150 h.p. steam engine and the other is a 650 foot, 12x14 machine driven by a 75 h.p. engine. Steam is supplied by two 150 h.p. boilers. In winter the exhaust steam is used for heating. This steam plant is located at the end of the long shed. In this same building are also located a Pirie tool sharpening machine and machine shop for repair work.

The granite blocks are cut, when necessary, by two gang saws,—a Lincoln, driven by a 30 h.p. induction motor and a Patch driven by a 40 h.p. motor. The trucks on which these blocks are sawed travel on tracks extending out into the open where they can be loaded and unloaded by the 50 ton derrick. The trucks are moved back and forth by the hoisting machinery of this derrick with the help of extra sheaves.

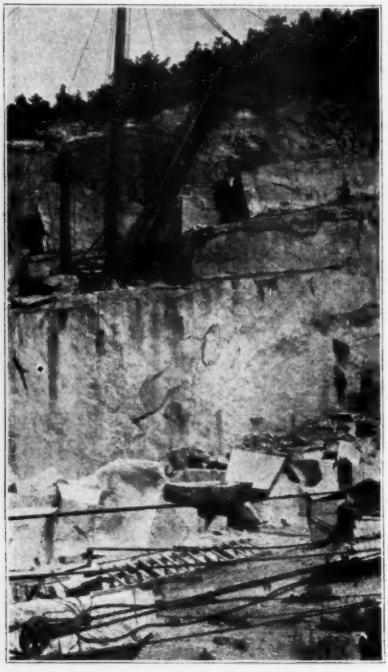


Quarry Men at a Wooden Derrick

The large new Patch lathe, located in its own separate building, will turn



Derrick Placing Large Blocks on Truck Running On Tracks to Top of Incline



View of Quarry Showing Formation

columns 16 feet long and 8 feet 4 inches in diameter. It is equipped with 4 steel disc cutters; and is driven by a 50 h.p. General Electric induction motor equipped with a compensator and Trumbull inclosed safety disconnect switch. In addition to this there are two other old lathes in the long shed, one of which has been assembled in the plant and is capable of taking columns 31 feet long and 4 feet 4 inches in diameter, and another small Putnam lathe. Both of these are steam driven.

The new Patch polishing lathe is also motor driven, (50 h.p.), and is located in a small separate building reached by one of the outside derricks as already described. Polishing is done in a series of operations as follows—Cast iron blocks weighing 100 pounds are placed along the full length of the surface. Under these are first placed steel shot with water for the rough work. The stone is then washed and carborundum substituted for the shot. After this finer carborundum is used under sheet tin instead of the cast iron blocks and finally, after preliminary washing, heavy wool felt.

The carborundum cutter, is a Patch machine, also motor driven and is housed in a separate building as already described. The carriage on which the blocks of granite rest is moved automatically by the mechanism of the machine but is loaded and unloaded by the same derrick which loads and unloads the gang saw trucks.

In the back of the shed are four Smith, Whitcomb and Cook polishing machines, or beds, steam and belt driven, and in the main part of the shed, between the tracks over which the dagoes operate, are eight Vavichi air polishers.

Home Made Locomotive Crane or "Dagoe"

Crushing Plant

This complete establishment has another interesting feature, and that is a stone crushing plant. This is located near the long shed. All of the cuttings from the various buildings are disposed of in this way and when these fail to provide sufficient material to keep the crusher busy waste material from the quarry is used. The crushing plant consequently serves the double purpose of disposing of refuse, which must be cleared away in any event, and of producing another source of revenue. As a general thing one freight car load of crushed stone is made per day.

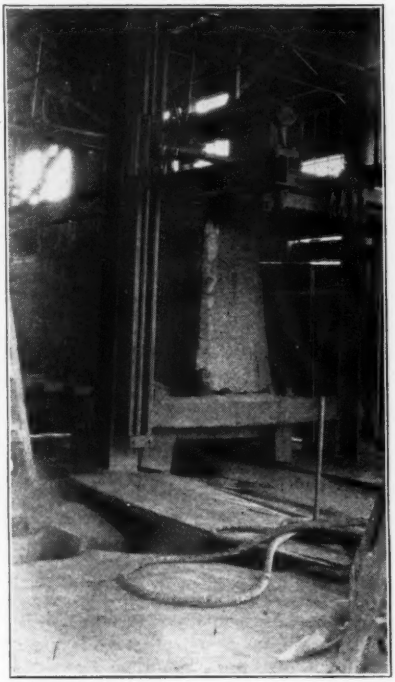
The crushing plant is very simple. It consists of one number 5 Champion crusher, a bucket elevator from this to a rotary screen at the top of the building and a series of bins for the different sizes of stone. The coarse pieces which do not pass through the screen drop into a chute and thence into a small car on the tracks below.

Material for the crusher is loaded into a small car on tracks extending from near the end of the long shed to a platform over the crusher. The loaded car is pulled by means of a cable operated by the hoisting engine of the nearby derrick.

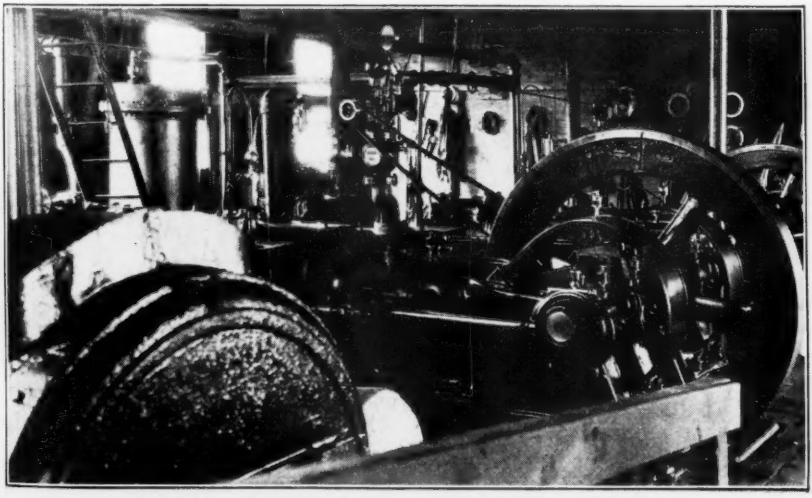
The crushed stone may be loaded by a chute into motor trucks or by another chute into freight cars.

Electric Drive

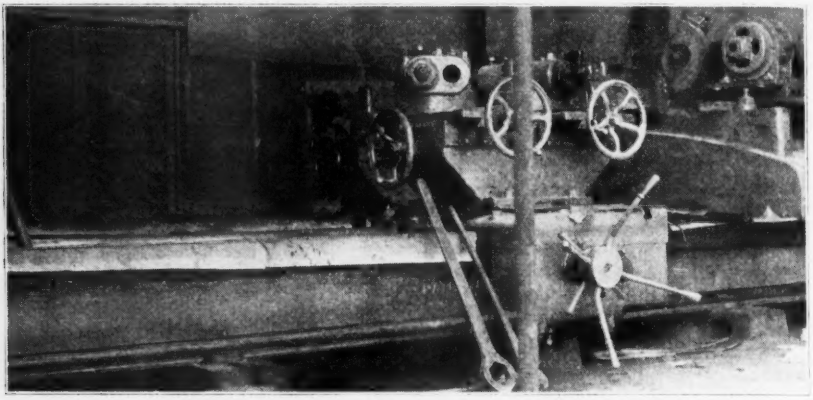
It will be noted that a mixture of steam and electric drive exists at present in this mill. This is simply the result of following the policy of retaining old equipment until its usefulness has been exhausted, either through wear or obsolescence, and making replacements, as well as new installations, in the most approved up-to-date manner.



Gang Saw Showing Track for Truck



Interior of Engine Room Showing Air Compressors

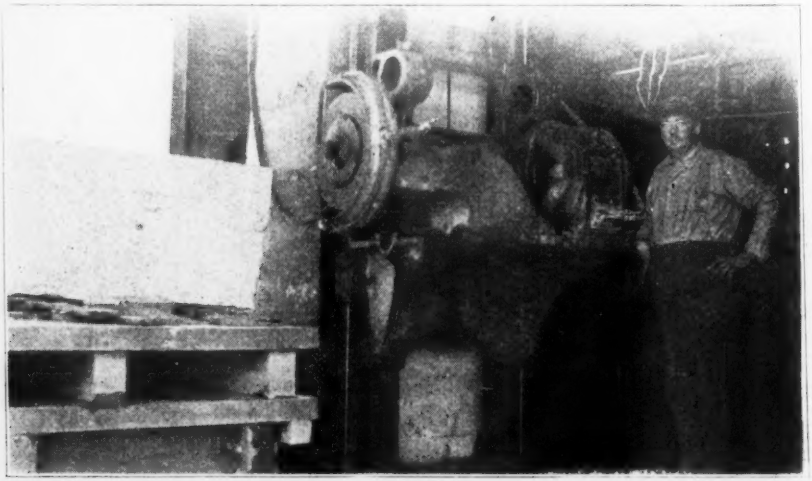


View of New Large Motor Driven Cutting Lathe

The gang says, carborundum cutter, new cutting and polishing lathes and the crushing plant are examples of recent changes. Others will follin time. That the locomotive cranes will be replaced by electric traveling cranes seems very remote because it would mean an entire rebuilding and rearrangement of most of the plant. This might be justifiable under certain circumstances but not at the present time. It would mean burdening the business with a large additional investment which would be incompatible with conservative management under existing conditions, or any conditions which can now be foreseen.

It is interesting, even decidedly refreshing, to see how efficient use has been made of existing plant and machinery in so far as practicable and how, where this has been impracticable, new types have been installed. This has been done so skilfully and with such evident care and foresight that one does not at all receive the impression, as is so often the case, that this is an old plant with a miscellaneous mixture of old and new equipment, but rather that the arrangements indicate a peculiarly high degree of efficiency in planning and management.

The Climax Engineering Company, Clinton, Iowa, announce the appointment of F. M. O'Laughlin as Sales Representative for their Eastern sales territory. Mr. O'Laughlin will make his headquarters at the company's offices, 30 East 42nd Street, New York City.



New Motor Driven Carborundum Saw

Crushed Stone Convention Program

MONTREAL from January 18th through the 21st, 1926, will be the scene for the National Crushed Stone Association Convention. The sessions will be held in the Mount Royal Hotel.

The following program is tentative only. Several of the speakers have not at yet definitely accepted and several changes may be necessary. Otho M. Graves, the association president, will preside.

Monday Morning

10:00 Address of Welcome by His Worship Charles Duquette, Mayor of Montreal.

10:15 Response for the Association and Presidential Address, Otho M. Graves.

11:00 Appointment of Convention Committees: Rules and Procedure, Resolutions, Nominating, Auditing, Entertainment, Reception, Publicity.

11:15 Reports of Directors on Business Conditions in 1925 and the Outlook for 1926.

12:45 Group Luncheons:
Highway
Salesmen
Superintendents
Agricultural Limestone
Concrete Aggregate and Ballast Manufacturers' Division.

Monday Afternoon

2:00 "Proposed Research Work of the Association," A. T. Goldbeck, Director Bureau of Engineering.

2:30 General Discussion on Bureau of Engineering, led by Ex-presidents:
A. J. Blair
John Rice
E. J. Krause
W. Scott Eames
F. W. Schmidt
John J. Sloan

3:00 Address on Testing Road Materials (Speaker not yet selected).

3:30 Discussion and General Business.

4:00 Adjournment.

Monday Evening

7:30 Opening of Exposition.
Highland Laddie Bagpipe Band.

9:30 Smoker and Entertainment—Banquet Room.

Tuesday Morning

10:00 Address by Hon. J. L. Perron, K.C., Minister of Roads, Province of Quebec.

10:30 Address by Prevost Hubbard, Chemical Engineer, Asphalt Association.

11:00 Address by O. F. Johnson, Assistant Freight Traffic Manager, Lehigh Valley Railroad.

11:30 "The Quarry Section of the National Safety Council and What it Plans to do"—E. E. Evans, President, Ohio Crushed Stone Association.

12:00 "The Fire Hazard of Quarry Plants and How to Carry It"—D. C. Souder, Insurance Manager, France Stone Company. Discussion led by those who have lost plants by fire.
John Rice
E. J. Krause
H. E. Bair
J. C. King.

12:30 General Business.

12:45 Adjournment.
Group Luncheons.

Tuesday Afternoon

Session for Superintendents and Operating Men.

Chairman—A. G. Seitz, Rock-Cut Stone Company.

2:00 "The Human Element in Plant Operation"—G. J. Whelan, President, Kelley Island Lime and Transport Company.
Discussion.

2:30 "The Advantages of a Tidy Plant"—A. L. Scott, Le Roy Plant, The General Crushed Stone Company.

2:45 "Oxygen, the Wonder Worker" followed by a series of experiments with Liquid Oxygen and motion pictures by the Director of the Welding Institute, Air Reduction Company.

3:30 "When and How to Wash Stone"—C. E. Klaus, Supt., Columbia Quarry Company.
Discussion.

4:00 "Rock Excavation on the Hydro Electric Canal"—F. A. Gaby, Chief Engineer, Hydro Electric Commission.

4:30 "Difficult Problems"—EVERYBODY.

5:00 Adjournment.

3:00 Sleighing Trip to Mount Royal and Toboggan Slide.

Tuesday Evening

Professional Ice Hockey Game—Ottawa vs. Canadians.

Wednesday Morning

10:00 "Railway Ballast"—Engineer Maintenance of Way.
Discussion led by J. V. Neubert, Engineer Maintenance of Way, New York Central Railroad.

Major George P. MacLaren, Engineer Maintenance of Way, Canadian National Railways.
G. L. Moore, Engineer Maintenance of Way, Lehigh Valley Railroad.
10:30 Reports of Standing Committees:
Ballast—John Rice, Chairman.
Cost Accounting—James Savage, Chairman.
Membership—R. B. Tyler, Chairman.
Standards—Col. O. P. Chamberlain, Chairman.
11:00 Address by Col. Frederic S. Greene, Superintendent of Public Works, New York State.
11:30 Address by S. L. Squire, Deputy Minister, Department of Public Highways, Toronto.
12:00 Reports of Convention Committees.
Rules and Procedure.
Resolutions
Auditing
12:30 General Business.
12:45 Adjournment.
Group Luncheons.

Wednesday Afternoon

Session of Salesmen—Harry H. Brandon, Ohio Marble Company, Chairman.
(Program to be announced)
3:00 Sleighing Trip through Old Montreal and French Section.

Wednesday Evening

Annual Banquet
Toastmaster—C. M. Doolittle, Canada Crushed Stone Corporation Limited.
Speakers—Sir Henry Thornton, Director, Canadian National Railways.
John A. Macdonald, State Highway Commissioner, State of Connecticut and President of the Association of Highway Officials of the North Atlantic States.
Charles M. Upham, State Highway Engineer, North Carolina State Highway Commission and Director, National Highway Research Board.
(Two other speakers to be selected)

Thursday Morning

10:00 Address by Frederic E. Everett, Commissioner and State Engineer, New Hampshire.
10:30 "Competition Between Various Aggregates"—F. R. Kanengeiser, First Vice-president and General Manager, Bessemer Limestone and Cement Company.
Discussion on "Competition of Road-side Gravel Pits"—led by C. M. Doolittle.
11:00 Address by William F. Williams, Commissioner, Massachusetts.
11:30 "How Can We Increase Membership?"
Discussion led by Col. R. B. Tyler, Membership Committee.
11:45 "How Can We Make Our Conventions of Greater Value?"
Discussion led by A. R. Wilson, Granite Rock Company.
12:00 Report of Railroad Committee, W. L. Sporborg, Chairman.
Discussion of report and of proceedings Ex Parte 87, led by:
Col. O. P. Chamberlain
J. J. Sullivan
E. J. Krause.
12:30 Report of Resolutions Committee.
Report of Committee on Nominations.
Installation of Officers for 1926.
12:45 Adjournment.
1:00 General Get-Together Luncheon.

Thursday Afternoon

2:00 Agricultural Limestone Meeting—J. C. King, Agricultural Limestone Association, Presiding.
2:00 Meeting Board of Directors and Officers, N. C. S. A.

The W. M. A. A. Annual Meet

The Wisconsin Mineral Aggregate Association held its annual meeting at the Elk's Club in Milwaukee, on December 17th. The officers and executive board members were elected for 1926 as follows: G. G. Brew, president; M. W. Deutsche, vice president; E. E. Gillen, secretary-treasurer; R. C. Brown, C. R. Nutt, L. L. Laun and G. D. Francey.

Mr. N. K. Wilson in presenting his annual message discussed the situation during the past year. During the course of his report Mr. Wilson remarked:

"At the start of the year 1925, the highway program of Wisconsin was somewhat indefinite. The general talk during the session of the Legislature was that the highway program would be seriously curtailed; and this was evident during the year. However, the aftermath of the legislative session was that we now have in Wisconsin an up-to-date, progressive, highway construction program, which will bear fruit in the year 1926.

In the evening a most successful banquet was held at which all of the important highway officials of the State of Wisconsin were present as guests.

Sand and Gravel Convention Program

PERTINENT discussions of practically all phases of the industry are scheduled for the sessions of the tenth annual convention of the National Sand and Gravel Association to be held at the Atlanta-Biltmore hotel, Atlanta, Georgia, Tuesday, Wednesday and Thursday, January 19, 20, 21. Routine matters will be disposed of at the meeting of the board of directors of the association directly preceding the convention sessions, leaving the assembly free to devote its time to solving business problems. The plan also will avoid extended business sessions.

Arrangements have been made with Mrs. Norman Sharp, president of the Atlanta Woman's club, to provide special entertainment features for the women visitors at the convention. These include a sight seeing trip to Stone mountain, Wednesday morning and a luncheon at the Woman's club Thursday noon with the association acting as host.

Sessions of the convention do not begin until Wednesday morning at 10 o'clock, but the board of directors will be in session Tuesday afternoon and members and visitors will be registered that afternoon. The registration desk will be on the main floor of the Atlanta-Biltmore hotel.

The program for the meeting is as follows:

Tuesday

Meeting of the Board of Directors, to convene at a luncheon when members of the Board will be guests of the National Association. Luncheon will be served at 12:30 o'clock at the Atlanta-Biltmore hotel. Among duties delegated to the Board of Directors by the constitution of the association, to be considered at the annual meeting of the Board, are the following:

1. Preparation of plan of activities for the association during the ensuing year, and also a budget to cover such activities, for submission to the convention as a whole for approval.

2. Nomination of candidates for the offices of president, vice-president, and secretary-treasurer, and also for three directors-at-large.

3. Selection from their own number of four members of the Executive Committee for the year 1926.

Registration of Members and Visitors

Registration will continue throughout the convention.

Wednesday Morning

10:00 Address of Welcome
Hon. Clifford Walker, Governor of Georgia.

10:30 Annual Address of the President.

10:45 Annual Report of the Secretary-Treasurer

11:00 "The Outlook for the Next Six Months"
George E. MacIlwain, Boston
A practical analysis of business probabilities with a reference to the country's construction program, with something about sand and gravel, pictured clearly and entertainingly. Standing as an independent economist, Mr. MacIlwain presents a carefully prepared composite of the best professional opinion,—as represented by the leading statistical and economic services —translated into a workable program for the business man. Mr. MacIlwain will be glad to answer questions and his audience is urged to interrogate him.

11:30 "Special Sands as By-Products from the Average Commercial Plant"
W. M. Weigel, United States Bureau of Mines, Department of Commerce

12:30 Adjournment

Wednesday Afternoon

Convening at 2:30 p. m., there will be a meeting of the Concrete Products Division of the National Sand and Gravel Association, to which all are invited.

The meeting of this division proved to be such an interesting feature of the 1925 convention in Chicago, that the Program Committee decided to repeat the meeting at the Atlanta convention.

E. W. Dienhart, general manager of the Acme Concrete Products & Gravel Company, Cement City, Mich., a well-known authority on concrete products, will preside as chairman of the meeting of the Concrete Products Division, and it is promised that the sessions will be of great value to all sand and gravel producers.

Wednesday Evening

Seven o'clock, annual dinner at the Atlanta-Biltmore hotel, informal, music and dancing, and entertainment.

Thursday Morning

10:00 Selling Sand, Gravel, Rock, by the Ton, vs. Guessing by the Yard
E. Earl Glass, General Manager, Pacific Coast Sand and Gravel Association, Los Angeles

10:30 Report of the Washed Gravel Ballast Company, Cincinnati, Ohio
Earl Zimmerman, Ohio Gravel Ballast Company, Cincinnati, Ohio

11:00 Should the National Association Promote Standardized Specifications for Sizes of Sand and Gravel?
Stanton Walker, Director, Engineering & Research Division, National Sand and Gravel Association

11:30 The Continuation of Federal-aid
Association of State Highway Officials, Washington, D. C.

12:00 Consideration Report of Board of Directors
Reports of Committees

12:30 Election of Officers

(Note: There will be a luncheon meeting of the newly elected Executive Committee, together with the retiring members of the Committee, immediately after adjournment of the Thursday morning session of the Convention.)

Thursday Afternoon
2:30 O'clock

Open Forum
Remarks of the Charter Members
Best Method Washing Sand and Gravel
Best Method Storage and Reclaiming Materials
Advantages Selling Sand, Gravel, Rock, by Ton
Demurrage on Frozen Shipments
Inspection of Materials at Plant
How Can Irresponsibility be Eliminated
Publicity for the Sand and Gravel Industry
Best Method Crushing Material
Best Method of Patching Cars
Split Loads of Sand and Gravel
How to Improve the Quality

The Lapeer Trailer Corporation, manufacturers of automatic semi-trailers, announces the appointment of Mr. J. B. Beattie as eastern sales manager, with headquarters in New York City. Mr. Beattie was formerly connected with the Autocar company.

Handling Hot Silica Sand

The elimination, or at least the mitigation as far as possible, of the dust-nuisance in sand-drying operations has always been a serious problem. The Toledo Vitrified Brick Company of Toledo, Ohio has, however, solved it in an unusual and very effective manner. The method commonly used is to pass the dust-laden air through a cyclone type dust arrester before permitting it to enter the stack, but since a cyclone arrester has a comparatively low efficiency a great deal of the suspended sand necessarily escapes into the air. This not only creates a nuisance but it also involves a considerable waste of useful material.

The high temperature of the sand, however, has hitherto prevented the use of the cloth screen arrester type of dust collector, even though it is decidedly more effective. The Toledo Vitrified Brick Co. on the advice of the Northern Blower Co., Cleveland, Ohio, installed a specially designed Norblo Screen Type Arrester which has resisted the severe operating conditions and works successfully.

This sand recovery unit is installed in the same relative position to the rest of the sand-handling equipment as would be the case with an ordinary cyclone arrester; that is, between the Cummer dryer and the stack. So completely is the sand-discharge eliminated that the recovery-percentage claimed is 99 per cent and over; and it is further stated that about 20 tons of sand are thus recovered daily.

New Gardner Products

A new vertical power driven compressor is being put on the market by the Gardner Governor Company. The new compressor, known as type XH is built to meet the demand for a machine to be operated by direct connection with commercial gasoline engine or electric engine motor. All superfluous weight being eliminated these machines are ideal for portable use.

The company is also marketing a duplex enclosed flood type lubricated pump. With an installation arranged so the pump can be operated by a float switch or remove control, the pump can be started by merely turning a switch. Very little attention is required. All running parts are enclosed in the crank case, which acts as an air reservoir for the flood lubrication system.

Road Show Program

CHICAGO will be host for the twenty-third annual convention and road show of the American Road Builders Association this month. The Road show will be held at the Coliseum, from Monday to Friday January 11th to 15th. The sessions of the convention will be at the Congress hotel Tuesday, Wednesday and Thursday of that week. W. H. Connell, president of the association particularly urges everyone attending the convention not only to attend the meetings but to take part in the discussions.

The program has been arranged to give free discussions for both engineering and construction problems. Besides the general sessions there will be sectional meetings for both engineers and constructors. The convention will be under the management of Charles M. Upham, state highway engineer of North Carolina.

The program committee, which is made of representative men in the highway construction realm has mapped out an interesting list of discussions and has obtained the promise from many prominent engineers and contractors to speak and take part in the discussion.

The road builders banquet will be held in the Gold room of the Congress hotel Wednesday evening. Charles M. Schwab will be the chief speaker. The program in detail follows:

Tuesday Morning

GENERAL SESSION

Presiding—William H. Connell, president, A. R. B. A., Engineering executive and Acting Secretary of Highways, Pennsylvania Department of Highways.

Opening Address by the President.

Addresses by:

Len Small, Governor of Illinois.

Wm. E. Dever, Mayor of Chicago.

C. H. Markham, President, Illinois Central Railroad.

Tuesday Afternoon

ENGINEERING PROBLEMS

Presiding—Frank F. Rogers, State Highway Commissioner of Michigan.

General Subject—Financing and Locating Highways.

2:00 Financing Highways (Federal, State, County and City)—Thos. H. McDonold, Chief, Bureau of Public Roads, U. S. Department of Agriculture.

3:00 Locating Rural Highways.

W. W. Crosby, Location Engineer, Pennsylvania Department of Highways.

4:00 Arterial Street Planning in Cities.

Eugene E. Taylor, Manager, Chicago Plan Commission.

5:00 Activities of Highway Research Board of the National Research Council.

Charles M. Upham, Director.

CONSTRUCTORS' PROBLEMS

Presiding—James Cameron, President, Illinois Association Highway and Municipal Contractors; Secretary, Cameron, Joyce and Company, Keokuk, Iowa.

General Subject—Making the Contracting Business Pay.

2:00 Investigation of Projects on Which you Bid.

N. F. Helmers, President, Siems, Helmers and Schaffner, St. Paul, Minnesota.

3:00 Estimating the Job.

A. R. Hirst, Chief Engineer, American Vibrolithic Corporation, Des Moines, Iowa.

3:45 Prosecuting the Work and Keeping Intelligent Cost Records.

W. R. Smith, President, The Lane Construction Company, Meriden, Connecticut.

4:30 Qualifications of the Contractor.

Col. George B. Walbridge, President, Walbridge-Aldinger Company, Detroit, Michigan; president Associated General Contractors of America.

Wednesday Morning

GENERAL SESSION

Joint meeting with the National Highway Traffic Association

Presiding—A. H. Blanchard, Professor of Highway Engineering and Highway Transport, University of Michigan; President, National Highway Traffic Association.

General Subject—Traffic

10:00 Measures for the Safety and Convenience of the Traveling Public (Signs, Policing, Traffic Lines, etc.)

Col. Sidney D. Waldron, Detroit, Michigan; member executive committee, American Automobile Association.

11:00 Future Developments of the Motor Vehicle.

C. F. Kettering, General Motors Research Corporation.

12:00 Possibilities of Motor Vehicle Transportation as a Supplement to Railroad Operation.

Officer of a steam railroad system.

Wednesday Evening

Road Builders' Annual Banquet, Gold Room, Congress Hotel.

Principal Speaker, Charles M. Schwab.

Wednesday Afternoon

ENGINEERING PROBLEMS

Presiding—George W. Borden, State Highway Engineer of Nevada.

General Subject—Construction.

2:00 Governing Factors in Selection of Durable Types of City Pavements.

C. M. Pinkney, Chief Engineer, Borough of Manhattan, New York City.

3:00 Recent Developments in Concrete Paving Practice.

H. E. Surman, Engineer of Design, Division of Highways, Illinois Department of Public Works and Buildings.

4:00 Recent Developments in Bituminous Paving Practice.

Harry McCahan Rex, Construction Engineer, North Carolina State Highway Commission.

Wednesday Afternoon

CONSTRUCTORS' PROBLEMS

Presiding—W. F. Creighton, president, Forster and Creighton Company, Nashville, Tennessee.

General Subject—Practical Operating Methods.

2:00 Increased Costs Due to Improper Fine Grading Methods.

C. J. Moritz, Contractor, Effingham, Illinois.

2:45 Relative Merits of Yard Handling of Materials With Derricks, Cranes, Conveyors, etc.

Robert P. Petersen, Henry W. Horst Company, Rock Island, Ill.

3:30 Economics of Equipment Standardization

Speaker not yet selected.

4:15 How to Stop Cement Over-Run

Robert E. O'Connor, J. C. O'Connor and Sons, Fort Wayne, Indiana.

Wednesday Afternoon

BUSINESS MEETING

Thursday Morning

ENGINEERING PROBLEMS

Presiding—Paul D. Sargent, Chief Engineer, Maine Highway Department.

General Subject—Operation and Maintenance.

10:00 Snow Removal

Victor T. Burton, State Highway Department, Lansing, Michigan.

11:00 Gang vs. Caretaker Maintenance

William H. Acheson, Division Engineer, New York State Department of Public Works.

12:00 Surface Treatment of Various Types of Roads

J. N. Mackall, Chief Engineer, Maryland Highway Department, Baltimore, Maryland.

Thursday Morning

CONSTRUCTORS' PROBLEMS

Presiding—Edward McCrady, President, McCrady Brothers Company, Braddock, Pennsylvania.

General Subject—Enlarging the Contractors' Field

10:00 Economic Reasons for Winter Letting of Road Work

J. H. Mullen, Vice-President, Nelson, Mullen, Nelson, Inc., Minneapolis Minnesota.

11:00 Relations Between the General Contractor and Sub-Contractor

C. E. Hair, President, Belmont Trucking Company, Terre Haute, Indiana.

12:00 Resurfacing and Maintenance Work as a Future Field for the Contractor

George F. Schlesinger, Director of Highways and Public Works, Columbus, Ohio.

Thursday Afternoon

FINAL GENERAL SESSION

Presiding—S. M. Williams, Vice-President, Autocar Sales and Service Company, Ardmore, Pennsylvania.

General Subject—The Contractor and the Engineer

2:00 One-sided Clauses in Public Works Specifications

General R. C. Marshall, Jr., General Manager of Associated General Contractors of America.

3:00 Relations Between the Contractor and the Engineer

C. M. Babcock, State Commissioner of Highways, St. Paul, Minnesota.

Tractor Locomotive Attachment

A line of locomotive attachments for McCormick-Deering tractors is offered by the Florida Machine and Foundry Company. It is called the Hardee locomotive attachment. A ten ton unit with a six wheel drive is made for the 15-30 h.p. tractor, a seven-ton unit with six wheel drive for the 10-20 h.p. tractor, and a five-ton unit with a four wheel drive also is offered for the 10-20 h.p. tractor.

The heavier locomotive known as type "H" has a wheel base of 97½ inches, 4-inch steel front axle, a cast steel center axle and a 2½ solid steel rear axle.

Progressive Methods Prove Profitable In Operating Slate Quarry

By F. A. Westbrook

QUICK advantage of natural surroundings has been taken by the Penrhyn Slate Company of Fair Haven, Vermont, which operates two slate quarries in that vicinity, the Alliance and Cedar mountain.

These two plants differ in character and require very different handling. The Alliance Quarry where roofing slate is produced is comparatively new and goes deep down. It is also situated along a valley where the only means of transportation is by trucking. Its operation will be described in a later issue of Pit and Quarry.

This article deals with the Cedar Mountain Quarry where electrical switchboard slate is turned out. The operation is situated on the side of a mountain on the shore of Lake Bomoseen, which is ten miles long, the lower end being only a short haul from the railroad. As the quarrying progresses into the mountain the bottom of the quarry rises and is nowheres below the level of the lake.

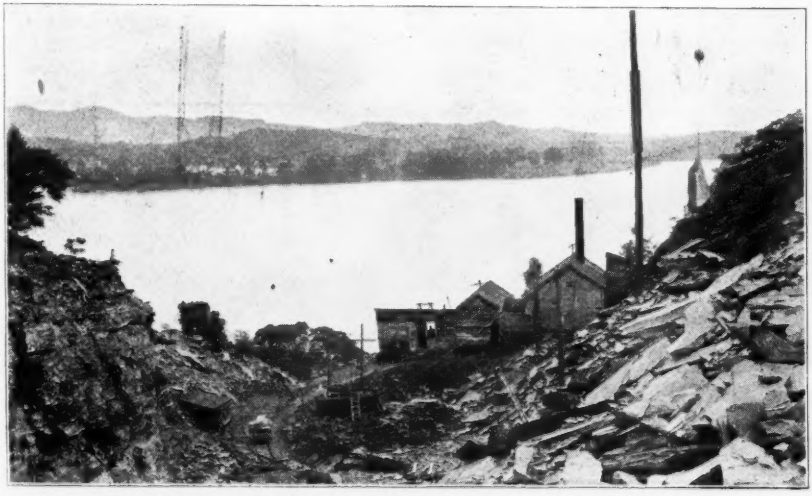
The result of this situation is that it is not necessary to pump out accumulations of water and that the lake itself furnishes excellent transportation facilities. It is the only quarry in this region which does not require pumping and where shipment can be made by water.

The slate taken from here is purple in color, very homogeneous and remarkably free from pyrites which make it valuable in the electrical industry. Such companies as the Westinghouse Electric and Manufacturing Company are among its customers.

Quarry

The quarry itself is exceedingly interesting and a good idea of it may be gained from the illustrations. The useable material is loaded on to small cars running on steeply inclined narrow gauge tracks extending part way up the mountain. There are two parallel tracks. As a loaded car descends the grade it pulls up an empty car by means of a cable passing around a drum equipped with brakes to control the speed.

There are two aerial cableways controlled by machines near the top of the mountain. These carry refuse back to the worked out part of the quarry and good pieces to the top of the inclined railway. Unfortunately the accumulation of refuse has perforce been such that the good material has to be deposited on a level part of a worked out portion of the quarry instead of being deposited directly on



View From Quarry Showing Hoisting House and Load of Slate Descending

Taking Out Slate

the small cars. This is done by a properly located derrick.

The fact that this is an old quarry where extensive sections have been worked to the bottom of the vein makes it possible to drop most of the rubbish from the advancing operations back into these old portions with only a short haul. In fact a great deal of the "over-burden" is thrown back into these spaces by blasting.

Blasting

It was the manner in which Mr. Griffiths, vice-president and general manager of the company, attacked and solved this blasting problem, which must have made him the idol of at least one equipment salesman.

Back in 1910 a salesman of the Loomis Machine Company tried to sell him a Clipper drilling machine. He told Mr. Griffiths just how the drilling should be done to move the overburden so that the bulk of it would not have to be rehandled and pointed out the savings that could be made. Mr. Griffiths was quick to realize the possibilities and agreed to pay the cost of making the trial and to purchase the machine if it proved successful. The cost of the machine at that time was between six and seven hundred dollars.

The trial was so successful that it would have been profitable to purchase a new machine for every blast. Naturally the salesman made his sale and the machine is still in use. The depth of the drill holes extended for considerable depth through the overburden to the good rock, and some of the very large pieces were thrown a good distance over into the worked out part of the quarry in the most frequent blast. It will be noted that there is very little earth over the rock. In this last blast there were 32 holes ranging from 25 feet to 65 feet in depth and a total charge of

Breast of Quarry Showing Drill Holes Through Overburden

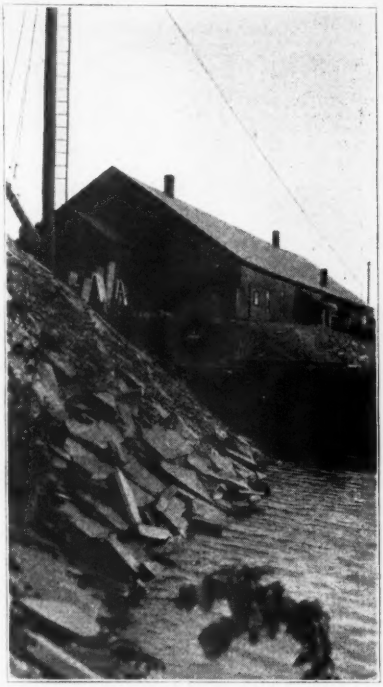
4,500 pounds of black powder. By following this method of blasting the cost of getting rid of the overburden has been reduced from $1.25 per cubic yard to 22 cents per cubic yard in spite of rising prices.

Rough Finishing

The tracks from the inclined railway extend directly into the mill, along its full length and out to the dock on the shore of the lake.

Formerly the finished slabs were produced at this mill but now, on account of the necessity of transporting sand and workmen some five miles from the foot of the lake, only the rough finishing is done here. This consists of sawing the slabs to proper size and planing to proper thickness, preparatory to polishing. There is a dock on the shore of the lake with a derrick for unloading trucks and bringing pieces out from the rough finishing mill, and for loading them on the barge for transportation to the finishing mill at the foot of the lake. This is done by solid tooth saws and Ruggles planers—the latter made by the Gray Foundry, Inc. The heavy pieces of quarry stone are moved from the cars to the saws and from the latter to the planers by means of small, hand operated, derricks which can deposit either to the right or left.

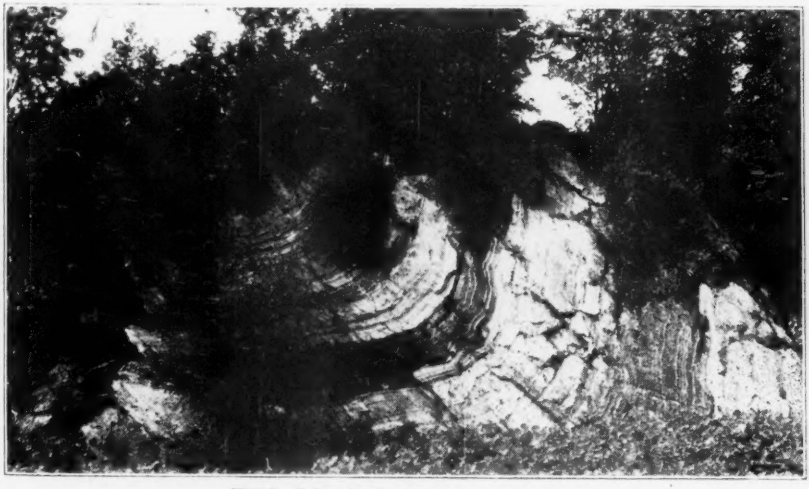
When this rough finishing has been completed the slabs are again placed on cars by a derrick and taken to the dock on the lake shore where they are either placed directly on a barge by means of a derrick, or they are piled up to await its arrival.



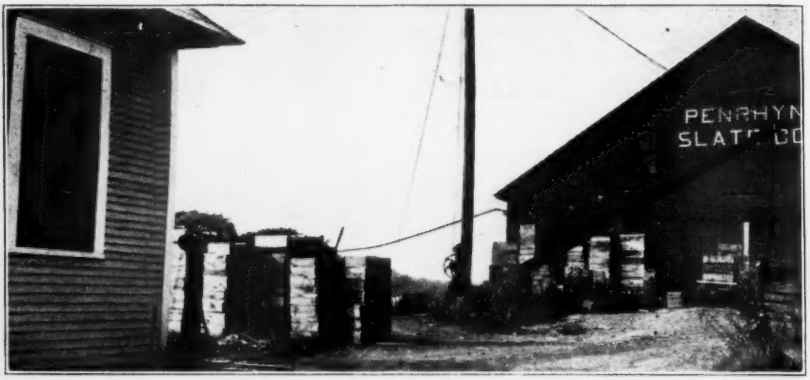
Finishing Mill Derrick at Left

Polishing

The barge is towed by a covered motor boat, which is also used to transport workmen to and from Hydeville, Vermont, at the foot of the lake near the Delaware and Hudson Railroad. It is at the foot of the lake where the polishing mill is located.

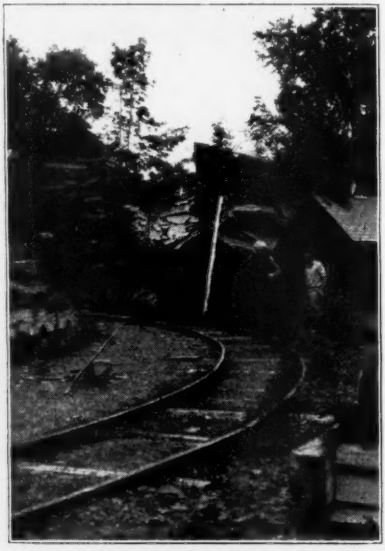


Typical Rock Formation of Region



Outside of Mill Showing Derrick for Loading Shipment on Trucks

Dropping Refuse Slate



Descending Tracks From Quarry

Quarry Tracks Entering Mill, Derrick Moves Slate From Car to Car

Carrier Throws Refused Pieces to Abandoned Portion of Quarry

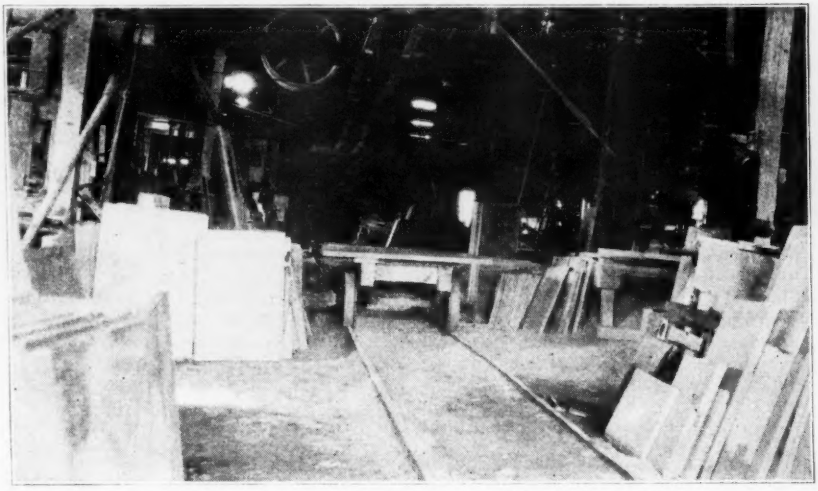
Another derrick is located near the barge dock. This picks up the pieces of slate and deposits them on a small car which is pushed into the mill on tracks extending clear through it and out at the other end. In winter when the lake is frozen the slate is carried by motor trucks over the ice.

This mill is also equipped with numerous small hoists and traveling hoists for handling heavy pieces. The other machinery consists of 3 rubbing beds, 2 saws, 2 planers, carborundum cutter, 5 drill presses, and 1 polishing machine.

The finished pieces of slate are of course crated for shipment after which they are placed on cars and pushed out doors where they are loaded on to motor trucks by an outside derrick.

Electrification

Of course all operations are electrified. In fact this company was a pioneer in electrification in this region as well as in the method of blasting already described. About 1909 the power company showed that it could save the Penrhyn Slate Company about $300 per year in power by electrifying a quarry now abandoned. It also agreed to construct the necessary lines if the Penrhyn Slate Company would agree to electrify the



Interior of Mill, Rubbing Beds at Left, Drills at Right

Cedar Mountain Quarry as well. As the power company was anxious to introduce electric drive into slate quarries they proposed a fifteen year contract at very advantageous rates. Mr. Griffiths had the nerve to try this. After electrification was complete it was found that the saving of $300 per year on the now abandoned quarry was being realized and that at the Cedar Mountain Quarry the saving amounted to $1,500 in one year. Furthermore, the contract lasted through the war period and the succeeding years of abnormally high prices when other users of electrical power, including most of their competitors, were paying much higher rates. Consequently Mr. Griffiths was well repaid for his progressiveness and the power company also profited because now all the quarries about here are electrified.

Another very progressive measure which Mr. Griffiths has adopted is the reforestation of Cedar Mountain. The property covers fifty acres and it has been pretty well stripped of trees. Of course where actual quarrying has been carried on or is likely to be extended in the near future, reforestation means nothing but this is really only a small part. In the other parts 5,000 small spruce trees have been planted and appear to be in thriving condition. This not only eliminates a bare spot which would mar the great natural beauty of Lake Bomoseen but in thirty years will provide a valuable supply of lumber.

New Type Water Gauge

A new type of instrument to show the water level in steam boilers is announced by the Bristol Company in a catalog bulletin just issued. The manufacturers claim the gauge is easily accessible for reading. It need not be installed on the boiler front but may be located considerable distance away, even in another building. The instrument is a modified pyrometer. It can be furnished in both indicating and recording models.

The instrument is operated by an electric current generated by a series of thermo-couples wound on a metal tube. No batteries or other outside current is required. As the water in the boiler rises and falls the variation in temperature along the tube produces a varying electric current. These variations are measured by the instrument.

The Story of Dynamite

"The Story of Dynamite" is the title of the latest addition to the list of educational motion picture films distributed by the Bureau of Mines, Department of Commerce, for the purpose of visualizing various phases of the mining and allied industries. The film, which was produced in cooperation with one of the larger explosives manufacturing companies, depicts modern methods of the manufacture of high explosives and illustrates the importance of dynamite in the mining, industrial and agricultural life of the country.

The mining and transportation of the natural nitrates of Chile, used so extensively in the manufacture of explosives, are shown. The manufacture of wood pulp, used as an absorbent, is depicted. The various chemical processes involved in the preparation of nitrate of ammonia, and the conversion of nitrate of soda into nitric acid are thrown upon the screen. A series of views depicts the manufacture of nitroglycerin in remote buildings surrounded for purposes of safety by wooden-cribbed barricades. The processes of cartridging dynamite, the manufacture of shells, the packing of cartridges, and the making of gelatin dynamite, are shown.

Other scenes illustrate the chemical testing of the various ingredients. The testing of the strength of an explosive in the ballistic pendulum, which measures the swing of the pendulum resulting from the impact of the explosion, is shown. Another scene depicts the firing of explosives into a steel gallery to determine the possible danger of exploding accumulations of gas or coal dust such as might be encountered in mine atmospheres. The methods by which boxes of explosives are packed in freight cars and the special types of motor trucks employed for their transportation in city streets are shown.

Glimpses are given of the use of high explosives in the open-pit iron mining operations in northern Minnesota. One striking view shows a tremendous blast in a stone quarry in which 54,000 pounds of dynamite was employed to break up 190,000 tons of rock. A series of slow motion views gives a vivid impression of the blasting of a railroad right-of-way. The use of gelatin dynamite in the construction of the Moffat tunnel now being driven under the continental divide in Colorado is illustrated.

Six Billion for Building in 1926

ANNUALLY for the past five years the Architectural Forum of New York has conducted an extensive survey among architects and builders to determine the amount of construction contemplated for the ensuing year. The method used includes obtaining of confidential reports from thousands of sources covering six geographical divisions of the United States in 19 building classifications. These reports are tabulated and correlated and the totals determined by a system of weighing. Thus the final figures are established after months of research work.

Each forum forecast during this five year period has proven amazingly close to the actual figures at the end of the year; and in all cases conservative, so this survey has become recognized as the most authoritative presentation of probable building activity. The allocation of activity throughout the country is an almost certain indication of what will actually take place in the industry.

In view of the fact that the Forum Forecast for 1926 indicates another six billion dollar building year, probably equal to the record-breaking activity of 1925, it will be interesting to review briefly the building activity of the year 1925 in order that comparisons may be clear. Figures for the year 1925 indicate that approximately six and one-half billion dollars were spent this year for new buildings in the United States.

At the beginning of 1925 all conditions indicated this year would equal 1924, which established a record, but no one anticipated the amazing volume to which the building totals have climbed. Records were broken everywhere during 1925 as will be seen by an examination of the accompanying chart, which shows the total value and volume of new building in 1925 as compared with each year since 1920, and also indicates the trend of building costs, commodity costs and real estate transfers in the United States.

Everyone connected with or interested in the building construction industry knows of the phenomenal activity which was apparent during the year 1925.

Probable Building Total for 1926

The accompanying table indicates the anticipated expenditures for new buildings during the year 1926, classified according to 19 types of structures and divided into 6 geographical divisions of the United States. This tabulation shows the amazing total of $5,584,782,500, which will pass over the boards of architects and into actual construction during the year 1926. In addition to this vast sum to be spent for building materials and labor there must be considered the fact that in the small house field and that of industrial construction there is considerable building not developed from architects' plans, probably totaling another half-million dollars.

Thus it is predicted that 1926 will be another six billion dollar building year with certain changes in the relative proportions of activity in building types and districts.

Changes in Public Demand

Each year the grand total of the Forum forecast is broken up into percentage showing the anticipated activity in new building construction for each of the 19 building types in the six established geographical divisions of the United States. By comparing these percentages for 1925 and 1926 it is possible to ascertain the changing public demand for new buildings and to establish for each district the relative activity which may be expected.

The first interesting comparison is to learn what, if any, shifting of public demand has occurred in building requirements for the following six geographical divisions of the United States:

1. Northeastern states, including Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

2. North Atlantic states, including New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia.

3. Southeastern states, including Virginia, North Carolina, South Carolina, Georgia, Florida.

4. Southwestern states, including Kentucky, West Virginia, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas.

5. Middle states, including Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas.

6. Western states, including Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, California.

The following table shows a comparison of public demand for new buildings in 1925 with that of 1926 for each of the six districts indicated above. In other words a comparison of the relative demand for new buildings in each district for 1926 as compared with 1925. The changes in these percentages forecast the changes of construction activity from a geographical viewpoint:

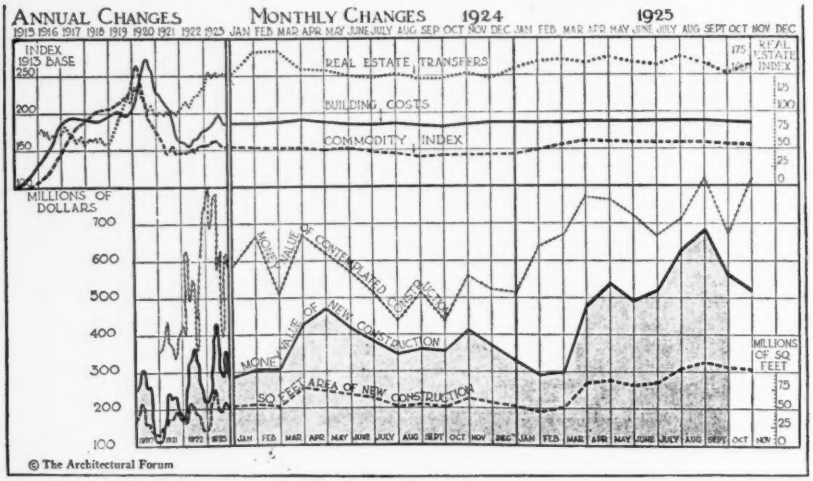
Public Demand for New Buildings

	1925	1926
1. Northeastern States..	8.4%	8.1%
2. North Atlantic States.	36.3%	36.6%
3. Southeastern States..	3.6%	5.9%
4. Southwestern States..	6.3%	6.4%
5. Middle States.....	32.4%	31.4%
6. Western States.....	12.9%	11.6%

The above comparison shows that there will be approximately the same relative building activity in each of the six geographical divisions of the United States during 1926 as compared with 1925 with some decrease in the Northeastern and Middle States and a considerable increase in the Southeastern States (due to activity in Florida).

The accompanying percentage tables indicate the change in public demand for new buildings; but it may also be noted that the general character of materials and workmanship in buildings is constantly improving.

The high cost of building together with increased real estate values, has during the past few years provided a forced education for the investing public in this field, indicating the fallacy of poorly considered planning and the use of inferior materials and workmanship. The great effort in the planning of buildings today is to



The Building Situation at a Glance

The chart shown here has been developed for the purpose of showing at a glance the situation in the building field at present and during the past few years by indicating the following components:

1. Index line showing relative number of realty transfers.

2. The index line showing the variation in building costs since 1915.

3. The index line showing the variation in general commodity costs since 1915.

4. A graphic record of the monthly totaled values of plans filed in the United States since 1919.

5. A graphic record of the monthly totals of contracts let in new construction in the United States since 1919.

6. A graphic record of the monthly totals of the volume of new building in the United States since 1919 as measured in square feet.

This information is developed from following sources of data:

The Forum record of building costs; reports of the United States Department of Commerce; reports of the F. W. Dodge Corporation; reports of Engineering News-Record, and from the National Association of Real Estate Boards.

eliminate all waste space and provide a maximum of rental or utility efficiency at the same time attempting definitely to reduce depreciation and maintenance cost through good architectural specifications.

Many mortgage companies, having learned the lesson of sound building collateral, are insisting upon better construction and upon a serious review of plans and specifications before building and permanent mortgage loans are made. The total effect of these conditions is reflected in a constant improvement in the character of new buildings and the placing of greatly increased responsibility upon the architectural profession, which to a great extent controls the expenditure of the building dollar.

Thus it is evident that 1926 will not only show a tremendous volume of new building construction but that these buildings will be in general of better architectural design and better construction.

Sound Economic Conditions

A highly important factor in all forecasts of this nature is the background of economic conditions. If business conditions in the United States were not good, with sound promises of so remaining for several years, there might be expected a definite curtailment of building activity but conditions are good, with definite signs of stability and as the building industry is the indicator of conditions, so with the entire economic situation favorable, there is little fear of a break in public confidence or any basic business change which will interrupt the anticipated program of another six billion dollar building year during 1926.

There is some talk of the building shortage having been met—of rentals coming down—of building again assuming its normal activity. What is a "normal" building year at the present time? Surely it cannot be the pre-war normal. The population of the United States has increased materially since then; the cost of building has increased; the standards of housing American life and business have been raised; the demand for building is greater. The probable "normal" building year of today is four billion dollars or more and on this basis it would take three or four six billion dollar years to meet the still-existing shortage.

All is well with the building industry. Some idea of the magnitude and importance of the construction industry may be gained from a statement recently made by Secretary of Labor Davis in which he said: "More than 11,000,000 of our people are dependent for their living upon the construction industry, and 22 per cent of all the skilled and unskilled labor of the country is engaged in the building branch alone. Some 250,000 freight cars are required to handle the mate-

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U. S. A.
Automotive	24,262,500	43,042,500	9,970,000	9,877,500	49,877,500	15,072,500	152,102,500
Banks	18,295,000	55,550,000	10,022,500	22,135,000	59,317,500	20,930,000	186,250,000
Apartments	25,272,500	329,042,500	40,620,000	18,627,500	137,565,000	50,540,000	601,667,500
Apartment Hotels	8,487,500	52,850,000	12,712,500	9,425,000	71,927,500	36,612,500	192,015,000
Clubs Fraternal, etc.	15,837,500	79,845,000	18,437,500	15,727,500	92,137,500	33,697,500	255,682,500
Community Memorial	18,030,000	53,812,500	4,712,500	9,772,500	38,287,500	24,835,000	149,450,000
Churches	39,370,000	79,232,500	17,537,500	41,510,000	78,042,500	28,752,500	284,445,000
Dwellings (Under $10,000)	11,635,000	104,227,500	20,312,500	13,675,000	49,012,500	30,277,500	229,140,000
Dwellings ($10,000 to $20,000)	9,985,000	49,217,500	10,415,000	12,040,000	35,225,000	9,142,500	126,025,000
Dwellings (Over $20,000)	7,295,000	27,372,500	5,287,500	5,807,500	27,985,000	9,737,500	83,485,000
Hotels	45,275,000	131,125,000	59,747,500	40,522,500	240,480,000	68,035,000	585,185,000
Hospitals	35,700,000	112,662,500	8,925,000	16,045,000	87,410,000	49,150,000	309,892,500
Industrial	42,632,500	248,917,500	6,527,500	29,810,000	130,962,500	24,542,500	483,392,500
Office Buildings	38,727,500	240,527,500	38,932,500	37,017,500	212,005,000	96,337,500	663,547,500
Public Buildings	18,597,500	79,242,500	19,760,000	19,325,000	49,057,500	39,382,500	225,365,000
Schools	68,815,000	255,202,500	23,017,500	38,400,000	236,992,500	68,217,500	690,645,000
Stores	8,660,000	38,027,500	11,150,000	7,032,500	43,415,000	14,932,500	123,217,500
Theaters	7,600,000	26,462,500	6,517,500	10,490,000	99,632,500	23,755,000	174,457,500
Welfare, Y. M. C. A., etc.	5,775,000	35,077,500	7,435,000	1,907,500	12,295,000	6,327,500	68,817,500
Total Value of New Buildings	450,252,500 8.1	2,041,437,500 36.6	332,040,000 5.9	359,147,500 6.4	1,751,627,500 31.4	650,277,500 11.6	5,584,782,500

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1926 FORECAST OF NEW BUILDING CONSTRUCTION
BY SIX GEOGRAPHICAL DIVISIONS (U. S.) AND NINETEEN BUILDING TYPES

rials. Our building bill is $200 per year for each family in the United States. It is truly the chief barometer of the business of the country. When construction gains, prosperity is with us. It is the great outstanding influence for good or bad in our financial progress."

Architects are busier than ever before—a sure sign of great building activity to come. The number of plans being filed is constantly increasing—another sign of activity. The Architectural Forum anticipates and predicts that approximately the following number of new structures will be added to the building census of the United States during 1926.

The total number of building permits which will be issued for structures of every kind, including alterations, will be approximately 700,000.

There will be constructed in the field of new buildings about:

Automotive Sales and Service Buildings—large	3,174
Automotive Sales and Service Buildings—small	6,740
Private Garages	274,000
Bank Buildings—large	1,320
Bank Buildings—small	4,350
Apartment Buildings—large and small	28,950
Apartment Hotels	1,240
Club and Fraternal Buildings	2,170
Community and Memorial Buildings	1,104
Churches	3,160
Dwellings under $10,000, including farm	193,000
Dwellings, $10,000 to $20,000	42,000
Dwellings, $20,000 to $50,000	14,700
Dwellings, above $50,000	3,190
Hotels, under 50 rooms	1,874
Hotels, over 50 rooms	1,414
Hospitals	1,117
Industrial buildings—large and small	9,782
Office Buildings	3,074
Public Buildings	972
Schools, small	2,156
Schools, large	1,742
Stores	7,842
Theaters	1,645
Welfare, Y. M. C. A., K. of C., etc.	670
Farm Buildings, not including dwellings	163,420
Institutions and Libraries	3,634
Total New Buildings for 1926	778,440

New Incorporations

Florida Portland Cement Company, Wilmington, Del., Capital, $12,500,000.

(Corporation Trust Co. of America) Incorporators: T. L. Croteau, A. L. Miller, Alfred Jervis.

Dry Harbor Sand and Gravel Corp., Capital, $20,000; M. Stellwagen and M. A. Wright, incorporators. (F. R. Greene, Atty., 149 Broadway, Manhattan, N. Y.)

America Cement Sheet Lath Co., Wilmington, Del., cement sheet products and lathing materials; Capital, $1,025,000. (Corp. Trust Co. of America.)

The Builders & Foundry Sand Co., Bedford, Ohio; Capital, $500.

E. J. Donohue, P. J. Greeley, G. O. Briggs, Jr., Jos. A. Schlitz, J. Harold Travers, incorporators.

Freshwater Sand & Gravel Co., Seattle, Wash., Capital, $150,000.

Automatic Oil Heating Co., 909 Essex Bldg., Newark, N. J., Manufacturing industrial and domestic oil burners, cement work, etc.; Capital, $125,000.

The Maine Sand & Gravel Co., Portland, Me., Capital, $150,000. Directors: George C. Owen, Edward S. Everett and Charles B. Dalton, all of Portland.

The Greenville Gravel Corporation, (Ohio corporation) qualified to transact business in Indiana; Capital, $375,000. Deal generally in sand, gravel and stone. Allen B. Coppock, 1960 Broadway, Logansport, Ind.

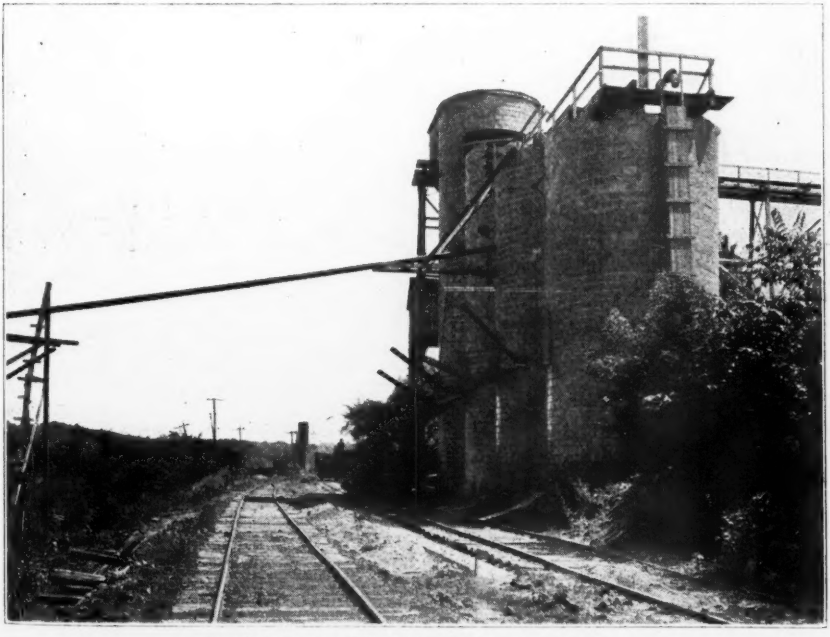
Phoenix Portland Cement Corp., Wilmington, Del. Capital, $2,500,000. Deal in cement of all kinds. T. L. Croteau, A. L. Miller, Alfred Jervis, incorporators.

Building a Reputation

SELDOM is there found an area rich in so many valuable properties as lies four miles to the south of Fort Dodge, Iowa, on the Minneapolis & St. Louis railroad. This choice tract, containing two hundred acres, is the property of the Johnston Clay Works Inc., and is pregnant with sand and gravel beds, coal veins, gypsum rock strata and clay of the most desirable quality. The display and sales rooms, of the Johnston company, are located in the First National Bank building, Fort Dodge, Iowa, while the manufacturing plant is at Clayworks, Iowa, on the tract above referred to.

The Johnston Clay Works Inc., has a most interesting history, having come into being in 1900, when four brothers, William, David G., Andrew and R. H. Johnston, started manufacturing brick and drain tile. None had any experience in the clay products field and produced their materials from experiments rather than from technical knowledge. As a result, their efforts were not crowned with success, and, in April, 1905, Andrew and R. H. sold their interests to William and David G., who continued under the name of the Johnston Brothers Clay Works, It was "up-hill" business, but despite discouragements, these two fearless men stayed with the ship, William having charge of the manufacturing end and David G. handling the office and sales. For years, David G. sold the entire output of the plant without other sales help.

Belt Conveyor Delivering to Washing Plant



The Screening, Washing and Loading Plant

At that time they were "brick and tile makers" and not "clay product manufacturers."

The Johnston Brothers Clay Works, progressed,—adding new machinery which was operated by skilled engineers; expanded,—building homes for themselves and their employees, new kilns, office buildings and other necessary improvements, including storage tanks, barns, etc., until it was deemed advisable to incorporate the company, which was done in October, 1923 under the name of the Johnston Clay Works, Inc. David G. Johnston was elected president, William, being elected vice-president, and each still handling his respective end of the business.

David G. Johnston died in the fall of 1924. The organization lost one of the pillars that had so valiantly supported it from the time of its inception in 1900. A dynamic character, it seemed it would be difficult to fill his place; and, indeed it has been. His passing necessitated another re-adjustment, which resulted in the making of William Johnston, president; G. F. Johnston, eldest son of David G., was named vice president and sales manager; W. E. Johnston, son of William, was elected secretary and treasurer and E. J. Halligan, general manager. In the early days, in order to reach the clay from which to manufacture the brick and drain tile, it was necessary to strip to a depth of thirty feet the sand and gravel deposit, all of which was discarded, because of lack of funds to install machinery for turning this vast waste into profit. But, under the splendid direction of these two men operating the plant—sons of the old Scotch stock whose perseverance and integrity has never been gainsayed—profits began, slowly, to accrue, until eventually a sand and gravel plant was added to utilize the valuable material being "dumped." At first, only a small output could be handled for lack of proper facilities and expert knowledge of the proper producing of material, but today, with a capacity of 1,000 tons, no plant in the middle west has a brighter future.

The stripping is done by hydraulic pressure, made easy by miles of pipes running from the pumping station on the Des Moines river, where by means of a centrifugal electric pump, with a capacity of twelve hundred gallons per minute, the water is forced to the remotest point of distance. The sand and gravel beds lying, in some instances but three feet from the surface, the stripping is of minor expense. The entire

The Sand and Gravel Operations

plant is interlaced with tracks, further reducing the overhead. The cars used in the sand and gravel plant are of the rocker dump type, and by the use of a Thew Electric Shovel, it is possible to fill a car at one operation. The raw material is hauled by mule to the hopper, which is equipped with a bar screen and all rock too large for this screen is dumped into a crusher beneath, where it is made of proper size and again returned to the hopper.

Using the Link Belt rotary screen equipment, the sand and gravel is carried on an 800 foot belt from the hopper to the washing plant, where it falls from the belt into the first screen. Here the washing and screening process begins. This first tank carries a screen of 1¾ inches and a capacity of two hundred tons; the second—or small gravel tank—has a ⅝-inch screen with a capacity of one hundred fifty tons; the third tank has a ¼-inch screen and a one hundred twenty-five ton capacity; while the fourth and last tank,—the fine sand tank,—has a ⅛ inch screen and a one hundred twenty-five ton capacity. Loading is done directly from the tanks. The washing plant is equipped with a 50 h.p. motor, making it possible to produce the full 1,000 tons daily capacity without difficulty.

Some six years ago, gypsum rock made its appearance between the sand and gravel beds and the clay beds. Being only about a foot deep, it was not in sufficient quantity to warrant giving it attention. But early in 1924 the strata began to take on proportions not to be ignored, and specifications were sent out for the installing of machinery to take care of this newest by-product. In January, 1925, a Williams patent crusher and pulverizer was installed, having a daily capacity of five hundred tons, but not until early spring was gypsum production begun. The gypsum strata run from three to ten feet and thickens as the vein is followed, the quality being of the finest yet tested in some of our best state laboratories.

The cars carrying the rock from the mines to the hoist, which are of the side-dump type, were built by the Johnston Clay Works Inc., machinists. The crusher is installed in close proximity to the sand and gravel hopper, so that all waste energy is dispensed with, as the gypsum plant is operated when the sand and gravel plant is not in use. In this way, the expense of producing gypsum is minimized and the profits, obviously, increased. This branch of the business, less than six months old, will be trippled during the next year and ample

The Johnson Clay Works, Inc.

provision for taking care of the increased production was made when installing the crusher. Up to this time the entire output has been disposed of as rapidly as it can be produced, thus saving the expense of storage.

In addition to sand and gravel and gypsum, the Johnston Clay Works, Inc., manufactures hollow building tile, suitable for any type of building; mortar mix, a by-product to be used in place of lime; drain tile; channel steel door frames for silos, barns, corn cribs, and warehouses; owns its own coal mines for producing coal for drying purposes, eastern coal being used for burning the high grade materials manufactured.

During the World War this plant became widely known. The business depression of 1920-1923, when so many organizations failed, was passed by this splendid organization, leaving it financially strong and anxious to take its place in the battle for better times and sounder business. The products of this company are sold only in car load lots; the gypsum going to companies manufacturing portland cement in large quantities and the sand and gravel for the most part, to lumber companies. Having an arrangement by which cars are delivered direct from its own switching tracks to any railroad running out of Fort Dodge, no plant is better prepared to take care of the volume of business coming into its office than is the Johnston Clay Works, Inc.

Climax Appointments

Mr. R. B. Sinnock has joined the Climax Engineering Company, Clinton, Iowa, as a sales representative. He will make his headquarters at Clinton and will handle sales of Climax gasoline engines in the territory adjacent to that point. Mr. Sinnock was previously a member of the sales force of the Dayton-Dowd Company, Quincy, Illinois.

Mr. C. H. Adams has also been appointed a sales representative for the Climax Engineering Company, and will travel throughout the southeastern portion of the United States. Mr. Adams has had a wide experience in the sale of mechanical equipment throughout the territory.

The Climax Engineering Company are manufacturers of the Climax trustworthy engines which are used not only in industrial equipment such as cranes, shovels, locomotives, excavators, etc., but also as power units for pumps, generators, hoists, etc.

Cement Plant Notes

The National Cement Company of Montreal, Canada, is soon to have a modern, 3000-barrel, dry process mill in production. The new plant will be completely electrified, power being purchased at 12,500 volts, 60 cycles, 3 phase from the Montreal Light, Heat and Power Company. Complete electrical equipment for the operation of the quarry and mill has been purchased from the Canadian General Electric Company, including several motors of 200, 300, 350 and 500 horsepower. The four 500-horsepower motors will drive tube mills and are of the super-synchronous type, correcting the power factor of the induction motor load. Throughout the plant there is a large number of motors of various ratings for general and specific duty. Full provision has been made for doubling the capacity of the plant without disturbing the present layout. A waste heat power plant is contemplated and provided for in the general plan.

The Indiana Portland Cement Company, Greencastle, Indiana, recently placed an order with the Northern Blower Company, Cleveland, Ohio, for three additional Norblo Dust Recovery Units. The four units already installed are of the cloth screen arrester type and are used in the bagging department. The new units are for removing the dust from the compeb department, and are of the double continuous suction air-filter type. They are designed for high recovery percentage and continuous operation. The dusty air first enters a cyclone arrester which collects all over-size material in suspension. Thence it passes to the air-filters. These consist of cylindrical steel-cased units, each having twelve filter bags. Each unit is cleaned periodically and successively at intervals of three minutes or less by means of air-reverse valves which automatically change the direction of the air flow and shake off the accumulation of dust on the bags; thus assuring constant filtering efficiency. Counter-weighted airtight gates at the bottom of the respective units automatically release the dust accumulated in the hoppers at intervals.

R. M. Weblemoe Company, Fairbury, Nebraska; sand and gravel and general contracting business; Capital, $25,000; John W. Boock and R. W. Weblemoe, incorporators.

Portland Cement Output in November

Production and shipments of Portland cement in November show the expected seasonal decreases, according to statistics compiled by the Bureau of Mines, Department of Commerce. As compared with the corresponding period of 1924 production shows an increase, shipments a slight decrease, while stocks are nearly 62 per cent greater. The following tables prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines are compiled from reports for November, 1925, received direct from all the manufacturing plants except one for which estimates were necessary on account of lack of a return.

Production, shipments, and stocks of finished Portland cement, by months, in 1924 and 1925, in barrels.

Month:	Production		Shipments		Stocks at end of month	
	1924	1925	1924	1925	1924	1925
January	8,788,000	8,856,000	5,210,000	5,162,000	14,155,000	17,656,000
February	8,588,000	8,255,000	5,933,000	6,015,000	16,815,000	19,689,000
March	10,370,000	11,034,000	8,995,000	10,279,000	18,189,000	20,469,000
1st quarter	27,746,000	28,145,000	20,138,000	21,456,000	.....	.....
April	11,726,000	13,807,000	12,771,000	14,394,000	17,159,000	19,877,000
May	13,777,000	15,503,000	14,551,00	16,735,000	16,403,000	18,440,000
June	13,538,000	15,387,000	15,036,000	17,501,000	14,903,000	16,409,000
2nd quarter	39,041,000	44,697,000	42,358,000	48,630,000	.....	.....
July	14,029,000	15,641,000	16,614,000	18,131,000	12,319,000	13,896,000
August	15,128,000	16,419,000	16,855,000	18,383,000	10,666,000	11,952,000
September	14,519,000	15,939,000	16,827,000	17,711,000	8,404,000	10,247,000
3rd quarter	43,676,000	47,999,000	50,296,000	54,225,000	.....	.....
October	14,820,000	15,992,000	17,160,000	15,309,000	6,073,000	*10,979,000
November	13,141,000	13,639,000	10,289,000	10,169,000	8,928,000	14,450,000
December	10,435,000	.....	5,506,000	.....	13,913,000	.....
4th quarter	38,396,000	.....	32,955,000	.....	.....	.....
	148,859,000	.....	145,747,000	.....	.....	.....

*Revised.

(000 omitted.)

Production, shipments, and stocks of finished Portland cement, by districts, in November, 1924 and 1925, and stocks in October, 1925 in barrels.

Commercial District:	Production November		Shipments November		Stocks at end of November		Stocks at end of Oct.
	1924	1925	1924	1925	1924	1925	*1925
Eastern Pa., N. J., and Maryland	3,376	3,457	2,845	2,909	1,211	1,350	802
New York	655	872	523	609	511	674	411
Ohio, Western Pa. and W. Va.	1,227	1,241	932	852	817	1,904	1,515
Michigan	928	988	581	585	629	1,218	815
†Wis., Ill., Ind., and Ky.	1,894	1,941	1,278	1,212	1,048	2,882	2,153
Va., Tenn., Ala. & Ga.	1,095	1,178	1,070	754	314	708	283
Eastern Mo., Ia., Minn., & S. Dak.‡	1,313	1,220	782	769	2,034	2,422	1,970
Western Mo., Neb., Kans. and Okla.	943	859	737	818	1,078	1,559	1,518
Texas	384	396	358	337	242	441	382
Colorado and Utah	194	65	134	113	241	349	398
California	887	1,099	890	1,029	364	527	458
Ore., Wash. and Mont.	195	323	159	182	439	416	274
	13,141	13,639	10,289	10,169	8,928	14,450	10,979

*Revised. †Began producing June, 1924. ‡Began producing December, 1924, and shipping January, 1925.

Estimated clinker (unground cement) at the mills at end of each month, 1924 and 1925, in barrels.

Month:	1924	1925	Month:	1924	1925
January	5,458 000	7,017.000	July	6,646.000	6,961.000
February	6,905,000	8,497.000	August	5,367.000	5,640,000
March	8,271,000	9,962,000	September	4,260.000	4,561,000
April	8,545,000	9,731,000	October	3,548,000	*4,086,000
May	8,225,000	9,053,000	November	4,025,000	5,004,000
June	7,609,000	7,937,000	December	5,433,000	.....

*Revised.

The New Davenport

A new 4-ton gasoline locomotive incorporating the Fordson engine and transmission parts was recently announced by the Davenport Locomotive Works, Davenport, Iowa. The Fordson power plant has been incorporated with the balanced rugged Davenport gasoline locomotive design and the ordinary Fordson transmission replaced by one which provides three speeds forward and three reverse. Fordson engine and transmission parts are used throughout however. This makes replacement and repair an easy matter.

The design of the locomotive is simple and accessible and the rugged, balanced construction found in the larger Davenports has been duplicated. The design is flexible allowing the use of a canopy cab, a fully enclosed steel cab, or the removal of the cab altogether. The operating levers are placed within easy reach at the right hand side of the cab and clear vision is provided in all directions.

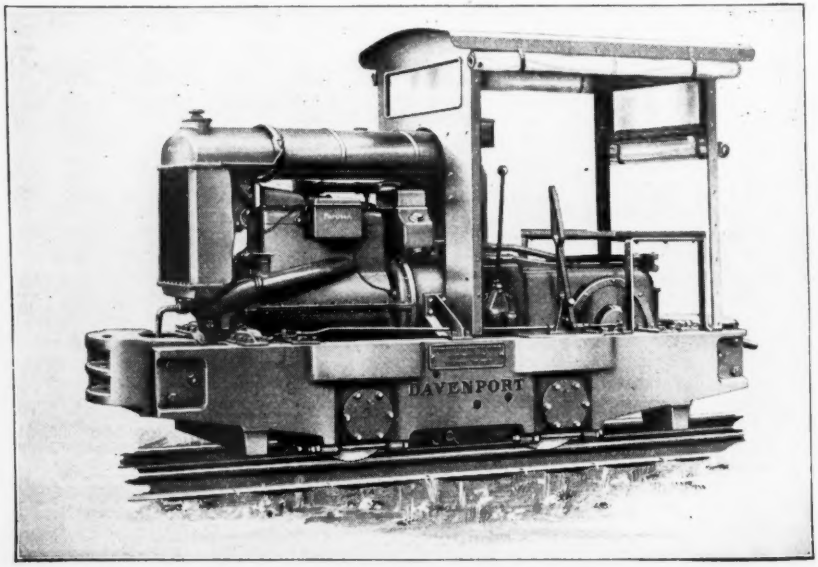
The locomotive has a speed range of 3 to 14 miles per hour and a maximum tractive power of 2,125 pounds. Its operation is highly economical—starting on gasoline and running on kerosene. This 4-ton locomotive completes the Davenport line of 4 to 20-ton gasoline locomotives.

New Speed Reducer Catalog

The Cleveland Worm and Gear Company has just issued a new bulletin insert to their catalog. The products of the concern include worm gear speed reduction units to be located between a motor or turbine and a driven machine. The manufacturers point to the fact that they have been in the business of producing these products since 1912 and there can be no guessing in their work.

The worms and gears of this company are made in a sufficient number of sizes to permit the adaptation of a standard size and type. In the manufacture of their line of speed reducers, the company has developed a stock of hobs for cutting ratios from 4 to 1 to 100 to 1 on twelve standard center distances. Gears are available in a variety of forms. Using two worms and two gears reductions as high as 5,000 to 1 are practical, the company believes.

The worms are of the straight body type with an involute thread having a 30 degree pressure angle. They are solid forgings of special low carbon nickel steel, carbonized, case hardened and ground all over including the flanks and threads. The gears in the smaller sizes are solid castings of special analysis gear bronze, phosphorized and chilled. In the larger sizes the gear rims are cast from the same bronze. They are shrunk and keyed on a cast iron center.



Davenpot Locomotive with Fordson Power

The Rollerless Rotary Screen

One of the most interesting developments of the past year in screening equipment has been in the design of revolving or rotary screens as accomplished by the Galland-Henning Manufacturing Company of Milwaukee, Wisconsin, which is known as the Rollerless Rotary recently placed on the market.

Rotary screens have been in general use for many years, but in recent years the rigid adherence required to exacting specifications for stone and gravel has brought to light deficiencies in screening equipment formerly unnoticed. The modern plant is subjected to the severest service, day in and day out, at an ever increasing pace, The result of these conditions brought about the development of the Rollerless rotary screen, to do its part in efficient and economical screening.

Two cardinal points predominate in its construction—ruggedness and simplicity. It is exceptionally strong and has few moving parts as shown in the illustration.

The original type of revolving screen had a center shaft with supporting bearings at both ends and spiders attached to the shaft to support the screen cloth. The center shaft and spiders were an impediment to the feeding of the material to the screen, as well as to the easy flow of material through this screen, also causing excessive wear on the various parts.

At a later date revolving screens were made with a single center bearing at one end and a tread ring with supporting rollers at the feed end, so that no obstruction would impede the feeding or flow of material through the screen.

Then the all roller type was developed but rollers at either end or both ends were not without their distinct disadvantages. The Rollerless rotary with a single supporting bearing at each end has the advantages of all previous designs without any of their disadvantages.

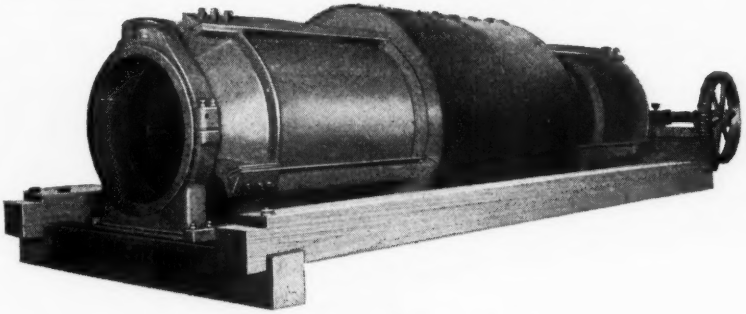
At the feed end as shown in the photo the large diameter bearing allows an unrestricted feed opening not exceeded in size by any type of screen. The lower half has a removable babbitt shell with liberal bearing area. The entire upper half of the bearing constitutes a grease chamber and the only point for lubrication necessary at this end, as compared to four inaccessible points in the roller type screen.

At the discharge end the bearings for the drive shaft and screen support are cast integral, thus insuring perfect alignment of the drive gears. The screen support bearing at this end also has removable babbitt shells, making it unnecessary to do a rebabbitting job in the field. Perfect alignment of the screen is assured at all times, and no destructive vibration can occur in any manner.

The drive shaft is of ample diameter and the bearings of such rigid construction that no outboard bearing is necessary for the drive shaft, even with the largest possible drive pulley.

The end thrust is taken by means of an easily removable bronze ring, made in halves that is interposed between the head and bearings at the discharge end.

To utilize this screen for washing purposes, the bearings at the drive end is made amply large in diameter with a hole thru the center so that a water pipe may be passed through the entire length of the screen without being supported in any manner on the screen itself.



The Rollerless Rotary Screen

The seats for the angle bars in the heads are machined to line up perfectly with the supporting bearings which in addition to the steel tee section tie bars, fastened between the angles at each screen section joint, insure a true cylinder at all times.

The feed end head is lined with removable steel plate sections on the inside and the angle bars at the discharge end are protected with special steel castings, thus no part of the screen proper with the exception of the screen section is subject to wear by the material passing through it.

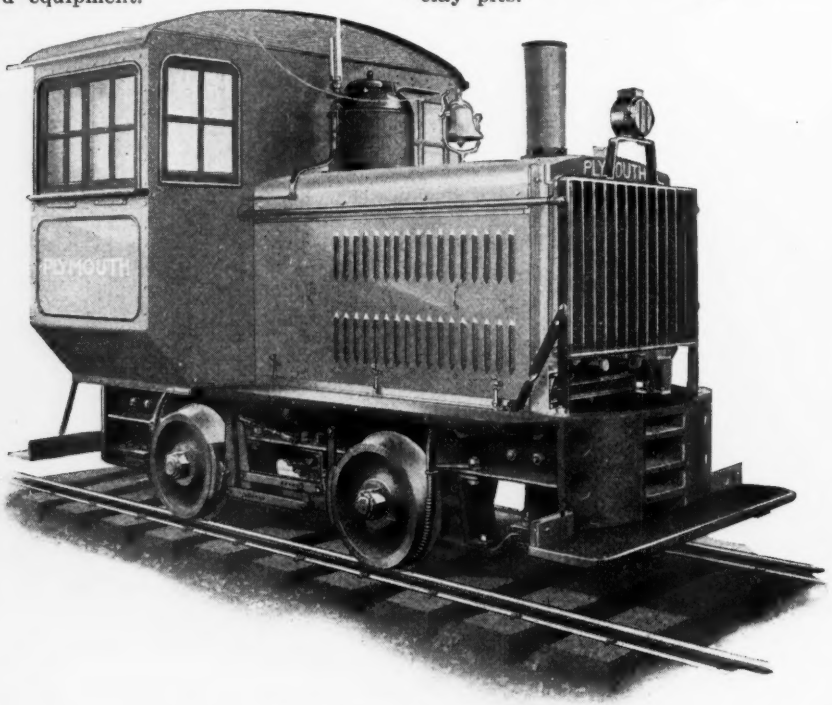
New Plymouth 12 Ton Gasoline Locomotive

The Fate-Root-Heath Company (Plymouth Locomotive Works) has recently brought out a new locomotive, known as Model JLB, weighing 12 tons. It is built in all gauges from 23-⅝ to 56-½ inches, with a wheel base of 63 inches. The length, overall is 15 feet 8 inches and the height, 9 feet 10 inches. The frame is of all steel construction with cast-steel bumpers.

The locomotive is powered with a Buda 6-cylinder engine, 4½-inch bore by 6-inch stroke, developing 88 h.p. at 1,400 r.p.m., equipped with Leece-Neville 12-volt starter with Bendix drive and Willard battery, Bosch magneto, Stromberg carburetor, United air cleaner, Pierce governor and Modine sectional radiator are standard equipment.

Transmission is the Plymouth sliding gear type, 4 speeds forward and reverse; gears alloy-steel, cut and hardened. The speeds are 3½, 5½, 11 and 18 miles per hour at engine speed of 1,400 r.p.m. The clutch is combination Twin Disc and Plymouth. Axles are of alloy steel, 5⅛-inch diameter and axle bearings are Hyatt high duty. The Alemite lubrication system is used. Brakes are to all 4 wheels, hand operated, or equipped with Westinghouse direct air system. Sanders are to all 4 wheels. The machine has electric lights, whistle and bell. A wide roomy cab enables the operator to see out alongside of railroad cars.

This locomotive is splendidly adapted to quarries, sand, gravel and clay pits.



The New 12-Ton Plymouth

Shipped to ..... January 1925 February 1925 March 1925 April 1925 May 1925 June 1925 July 1925 August 1925 September 1925 October 1925
Alabama 85,410 103,513 177,510 191,541 185,314 214,195 256,741 277,605 192,882 158,210

Distribution of Cement

The following figures show shipments from Portland cement mills distributed among the States to which cement was shipped during 1925 up to and including September.

Shipped to	January 1925	February 1925	March 1925	April 1925	May 1925	June 1925	July 1925	August 1925	September 1925	October 1925
Alabama	85,410	103,513	177,510	191,541	185,314	214,195	256,741	277,605	192,882	158,310
Alaska	132	0	294	709	0	1,284	2,816	264	455	528
Arizona	34,370	25,945	27,009	31,264	32,749	32,451	37,842	33,328	34,380	33,577
Arkansas	41,370	44,352	72,198	94,695	87,340	92,101	78,059	88,143	54,377	52,339
California	98,883	753,123	1,029,118	1,027,744	1,081,945	1,066,088	1,061,048	1,154,523	1,120,092	1,125,094
Colorado	42,425	69,871	102,537	131,363	125,744	120,818	118,272	118,335	122,128	103,024
Connecticut	34,810	50,026	113,668	160,616	177,292	172,564	176,644	194,911[1]	232,265	230,906
Delaware	5,786	9,444	21,766	41,573	28,892	37,330	43,326	50,949	63,024	63,752
District of Columbia	37,285	65,176	58,474	70,765	103,996	81,334	82,133	83,155	84,260	94,295
Florida	265,463	227,811	272,094	261,180	313,846	348,330	341,849	310,457	522,465	535,817
Georgia	93,062	98,569	140,634	112,250	127,545	129,748	132,050	136,542	134,340	134,198
Hawaii	417	0	1,500	2,250	5,608	6,108	993	1,108	3,511	8,086
Idaho	2,598	11,029	17,667	28,393	28,613	28,122	28,498	31,846	24,959	21,228
Illinois	463,388	378,947	846,638	1,467,815	1,790,601	1,636,329	1,843,734	1,790,148	1,658,700	1,256,952
Indiana	139,782	143,464	255,597	433,996	569,436	617,360	658,042	690,042	625,962	476,635
Iowa	53,044	52,039	161,164	284,477	346,484	310,558	327,155	375,407	368,763	259,971
Kansas	33,588	120,405	212,402	232,220	242,880	233,522	226,787	254,074	205,607	215,258
Kentucky	52,013	68,970	115,222	174,795	195,351	231,491	229,652	220,859	196,628	139,790
Louisiana	75,992	97,638	98,193	108,250	99,402	100,016	99,111	105,440	80,907	77,948
Maine	4,837	5,238	21,702	36,163	38,435	43,541	41,475	37,277*	40,051	40,243
Maryland	47,635	98,231	143,291	207,844	231,935	249,105	247,835	235,983	260,019	196,739
Massachusetts	113,101	134,591	257,381	344,406	374,406	350,620	386,058	356,341*	326,615	349,702
Michigan	190,905	248,240	437,712	859,815	1,140,027	1,264,462	1,229,598	1,194,934	1,195,566	992,423
Minnesota	59,395	97,034	173,618	321,854	425,473	409,235	436,453	472,018	455,011	375,975
Mississippi	29,867	28,564	35,778	48,174	47,573	66,012	67,446	70,141	56,979	41,777
Missouri	115,141	162,992	379,157	489,316	652,330	583,561	683,097	723,916	597,568	505,730
Montana	5,334	6,093	16,450	23,030	28,170	28,904	31,486	31,638	24,598	19,205
Nebraska	31,832	46,281	99,780	180,951	198,338	181,516	203,863	210,305	206,703	193,568
Nevada	2,492	5,177	7,254	10,767	11,676	10,784	10,068	12,635	10,598	10,048
New Hampshire	9,419	15,911	27,592	39,906	36,814	40,837	41,843	52,941	48,675	52,975
New Jersey	157,612	243,534	498,227	722,751	721,605	737,572	760,944	653,685	809,251	847,301
New Mexico	7,911	10,320	18,865	19,699	17,141	18,406	16,323	17,246	12,945	17,048
New York	400,896	587,674	1,159,830	1,717,441	2,028,808	2,090,644	2,170,960	2,151,191*	2,006,604	1,880,822
North Carolina	79,817	128,770	200,097	277,616	289,056	324,201	343,683	340,027	354,835	328,705
North Dakota	1,380	3,742	16,589	38,937	47,789	66,089	55,305	37,735	33,458	28,020
Ohio	259,628	271,075	592,069	894,683	1,054,230	1,099,767	1,099,016	1,212,138	1,118,150	870,645
Oklahoma	58,872	155,083	203,161	201,886	235,096	225,879	225,729	286,912	195,542	212,696
Oregon	54,117	60,816	103,813	101,661	129,048	134,038	143,672	157,360	157,333	155,066
Pennsylvania	288,916	421,519	808,636	1,250,501	1,482,560	1,869,299	1,869,377	1,852,731*	1,937,173	1,490,931
Porto Rico	0	0	0	0	0	0	0	0	346	0
Rhode Island	15,688	17,908	54,083	79,063	72,914	89,213	75,383	71,369*	71,846	84,229
South Carolina	46,840	73,313	72,929	65,806	74,198	85,087	75,376	92,255	82,742	69,548
South Dakota	4,331	14,528	40,697	57,039	66,445	59,120	55,487	57,380	56,838	41,532
Tennessee	69,669	87,499	116,856	133,037	163,812	185,536	208,562	193,279	171,080	118,768
Texas	260,540	345,057	381,320	401,517	373,605	411,795	418,401	404,161	328,962	290,696
Utah	3,794	16,821	28,567	33,469	41,447	37,733	38,975	45,985	44,564	40,238
Vermont	3,129	3,060	10,312	25,353	24,178	26,978	26,245	23,698	28,794	31,509
Virginia	54,445	95,942	132,891	160,139	154,167	172,760	180,025	176,842	184,071	156,782
Washington	85,969	90,669	151,814	180,845	265,735	328,589	334,466	323,325	258,182	254,164
West Virginia	45,912	56,629	85,703	134,357	140,992	161,484	164,874	177,994	201,698	193,757
Wisconsin	113,396	73,320	142,620	358,379	507,654	569,687	562,363	626,004	513,479	285,712
Wyoming	3,492	9,181	16,358	19,981	32,466	31,290	25,691	31,042	20,461	16,522
Unspecified	15,964	26,430	46,236	34,875	8,023	3,996	48,647	10,520*	74,427	36,326
	5,092,090	5,961,563	10,205,073	14,327,067	16,659,016	17,417,489	18,033,478	18,258,726	17,610,869	15,217,110
Foreign countries	69,910	53,437	73,927	66,933	75,984	83,511	97,522	124,274	100,131	91,890
Total shipped from cement plants	5,162,000	6,015,000	10,279,000	14,394,000	16,735,000	17,501,000	18,131,000	18,383,000	17,711,000	15,309,000

The New Whitcomb

The new 22-ton Whitcomb locomotive, a recent addition to the company's line of gasoline locomotives, finds its place where operations are such as to require a hauling unit of large capacity for heavy loads over long distances, or over heavy grades.

Built to ample dimensions and of such materials as to withstand the strain of heavy service, this new 22-ton promises to be a big factor in modern haulage.

The wheel base is 60 inches, height over the cab 124 inches, length overall 18 feet 4 inches, and it is made in all gauges, according to requirements.

It is powered by either a 6-cylinder Beaver, or a 6-cylinder Climax engine rated at 132 horse power at 1,000 r.p.m. Equipped with Bosch magneto, Impulse starter and a regular Whitcomb four-speed transmission, which allows four speeds in either direction. All gears are of chrome vanadium steel; the clutch being of the Whitcomb multiple-disk-cork insert type.

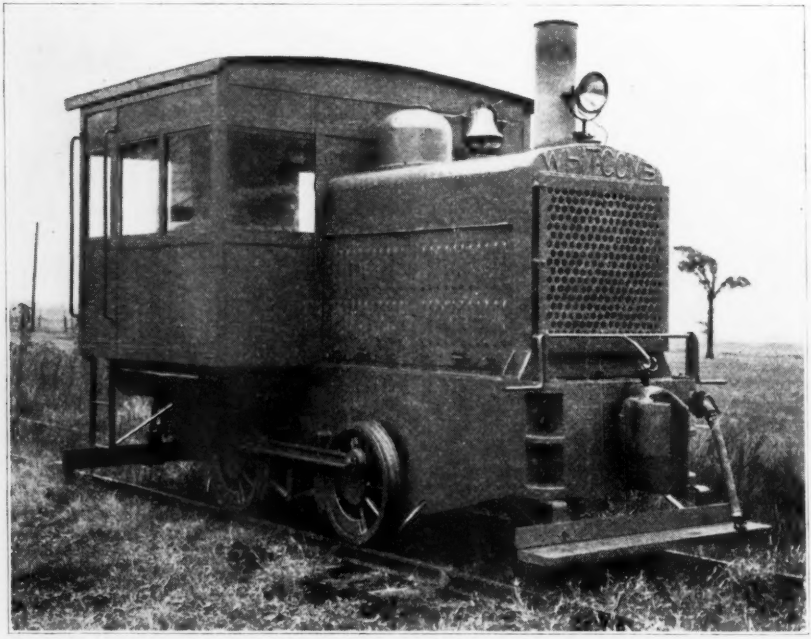
The weight in full working order is 44,000 pounds and a draw-bar pull of 11,000 pounds is promised on a dry rail and level track. It has special artillery type radiators and gasoline tank of 40 gallons capacity.

Two New Bay City Catalogs

Two new catalogs have just been issued by the Bay City Dredge Works, manufacturers of walking, crawler, track and floating dredges, cranes, excavators and loaders. The two new catalogues cover the model 4 one man convertible Excavator, and model 16-B convertible Excavator.

The model 4 a ½ yard capacity excavator is described in catalog 24 convertible and equipped with ½ yard capacity shovel, skimmer shovel, trench scoop, drag line or clamshell. It is designed to fill the gap between hand labor and the high price shovel equipment for small and average sized jobs. It is especially made for clay pits, sand and gravel pits, stripping, loading or unloading cars, small ditch or trench work, back-filling, road excavation. The manufacturers say it has endurance and digging power, low operation and upkeep cost. It is offered with both gasoline and electric power.

Catalog 25 deals with the 16-B model which is a convertible crane-excavator. It is a five-in-one, all steel machine operating a ¾ yard capacity bucket. Bucket attachments include skimmer shovel, trench shovel, shovel, clamshell or drag line,



New Whitcomb Locomotive

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All equipment overhauled in our Shop is furnished in guaranteed condition, subject to thirty days' trial in service.

STEAM SHOVELS—Railroad Type

(Note:—All Railroad Type Steam Shovels can be furnished on full caterpillar mountings if desired.)

1—95-C Bucyrus. Shop No. 1235, 4-yd. or 5-yd. dipper.
1—Model 80 Marion. Shop No. 1312, 4-yd.
1—Model 75 Marion. Shop No. 2112, 2½-yd. or 4-yd. dipper.
1—70-C Bucyrus. Shop Nos. 1197, 2½-yd. dipper.
4—70-ton Bucyrus. Shop Nos. 920, 939, 977 and 1233, 2½-yd. dippers.
5—Model 60 Marion. Shop Nos. 1301, 1995, 1999, 2059 and 2238, 2½-yd. dippers.
2—60-C Bucyrus Shop Nos. 1286 and 1388, 2½-yd. dippers.
1—45-C Bucyrus. Shop No. 1201, 1¾-yd dipper.

STEAM SHOVELS—Full-Revolving

1—80-B Bucyrus Caterpillar Type Steam Shovel. Shop No. 4002—New November, 1923. Equipped with 41-ft. 6-in. boom, 26-ft. dipper arm and 2½-yd. dipper.
2—Model 31-Marion. Shop Nos. 3341 and 3613, 1-yd. dipper. Traction wheel or railroad truck mounting.
1—18-B Bucyrus. Shop No. 1870, ⅞-yd. dipper. Traction.
3—Type "B" Erie. Shop Nos. 1989, 2084 and 2144. Steel Caterpillars. High lift boom, long dipper arms with ¾-yd. dippers. Power boom hoist. Located Verdigris, Oklahoma.
1—Model 21 Marion. Shop No. 4294, steel caterpillars, standard boom and dipper arm, ¾-yd. dipper.
2—Model 104 Northwest Gasoline Shovels. Shop Nos. 213 and 263. Caterpillars, standard boom and dipper arm with ⅞-yd. Manganese dipper. Located Verdigris, Oklahoma.
2—Type "B" Erie. Shop Nos. 1484, 1880, Caterpillars, high lift, ¾-yd. dippers.

SIDE DUMP CARS

10—30-yd. Clark All-Steel Dump Cars. Located Lodi, Ohio.
4—20-yd, Western All-Steel Air Dump Cars, vertical cylinders.
12—16-yd. Western Air Dump Cars.
7—12-yd. Western Air Dump Cars, 19-ft. beds, box girder doors.
16—12-yd, Western Air Dump Cars. 19-ft. beds, box girder doors. Vertical cylinders.
8—12-yd. Western Air Dump Cars, 26 ft.
2—12-yd. Western Hand Dump Cars, 19-ft. beds, box girder doors.
29—12-yd, Western Air Dump Cars, Truss-rod doors, 26-ft. beds.
3—12-yd. Oliver Hand Dump Cars.
6—8-yd. Western 36-in. ga., double trucks.
10—6-yd. K. & J. Steel Sills, Truss-rod doors. Located Burnaugh, Ky.
10—6-yd. Western, std. gauge, wood sills, Truss rod doors, automatic couplers.
18—6-yd. Continental, std. gauge, Steel sills, truss-rod doors.
21—1½-yd. Western, 24-in. gauge.

SPREADER CARS

1—Std. gauge Western Spreader Car.

STEAM SHOVEL PARTS

1—5-yd. Dipper for 95-C Bucyrus Shovel.
1—Boom for Marion 60 or 61 Shovel, length 35-ft. 22-ft. dipper arm, 1½-yd. dipper, long jack arms, etc.
1—19-ft. 6-in. boom. 12-ft. sticks and ditcher bucket for Type B Erie Shovels.
1—22-ft. dipper stick for Type B. Erie Shovel.

LOCOMOTIVES—24-in. Gauge

3—7x12 Davenport Dinkies. Shop Nos. 1202, 1411 and 1524. Weight 9 tons.
1—6x10 Davenport Side Tank Dinkey. Shop No. 1307. Weight, 7 tons.
1—7x12 Vulcan Saddle Tank. Weight 9 tons.
1—6-ton Whitcomb. Shop No. 1259. Gear drive. Gasoline.

LOCOMOTIVES—36-in. Gauge

1—11x16 Davenport four-wheeled Saddle Tank. Shop No. 2027. New in 1924. A.S.M.E. boiler, 170 lb. pressure. Steam brakes.
1—9x14 Vulcan Dinkey. Shop No. 1675. Weight, 14 tons.
2—7x12 Davenport, 4-wheel Saddle Tank. Shop Nos. 1566 and 1567.
1—9-ton Whitcomb Gasoline Locomotive.

LOCOMOTIVES—Standard Gauge

1—19x24 Baldwin 6-wheeled S. T. Shop No. 49553, built 1918. Weight 67-tons, air brakes, 180 lbs. steam pressure.
1—17 x 24 Davenport 6-wheeled switcher with tender. Shop No. 1269. Steam pressure 180-lbs. Weight 47-tons.
1—16x24 Davenport 4-wheeled Switcher. Shop No. 858, weight 38 tons, 170 lb. steam pressure. Located Verdigris, Oklahoma.
1—16x24 Baldwin 4-wheeled Switcher. Shop No. 34631. Weight 39 tons, 180 lb. steam pressure. Located Verdigris, Oklahoma.
1—14x20 Vulcan 4-wheeled Saddle Tank. Shop No. 1741. Weight 38 tons. 165 lb. steam pressure.
1—16x24 Vulcan four-wheeled Switcher, with tender. Shop No. 1764. Steam pressure 180-lb. Weight 40 tons.
2—11x16 Davenport 4-wheeled Saddle Tanks. Shop Nos. 1938 and 1951. New 1923. A.S.M.E. boilers carrying 170 lb pressure. Steam brakes. Electric headlights.

DRAGLINE EXCAVATORS

2—Class 24 Bucyrus. Shop Nos. 858 and 859. Steam operated, skids, 100-ft. booms, 3½-yd. Page buckets, electric lights, coal hoists, Located near E. St. Louis, Illinois.
1—Class 20 Bucyrus. Shop No. 813. Skid and roller, 85-ft. boom, 3-yd. Page bucket.
1—Class 14 Bucyrus. Steam operated. Shop No. 748. Caterpillars. 60-ft. boom, 2-yd. Page bucket.
1—Monighan No. 2. Shop No. 789. Skids. 60-ft. boom, 2-yd. bucket.
1—30-B Bucyrus. Shop No. 3641. Caterpillar. 40-ft. boom. 1-yd. bucket.
1—Model 210 P&H Gasoline Dragline. Shop No. 1077 Armored caterpillars. 40-ft. boom, 1-yd. Page bucket.
1—Model 4 Austin Caterpillars. 40-ft boom. Shop No. 112. New in 1923.
1—Complete Caterpillar arrangement for Class 14 Bucyrus Dragline equipped with armored tread.

CRANES

1—Model 102 Northwest Gasoline. Shop No. 102. 40-ft. boom. Bucket-operating. Located Verdigris, Oklahoma.
1—Type "B" Erie. Shop No. 929. Caterpillars, 36-ft. boom. Bucket-operating, ¾-yd. clam shell.
1—Type "B" Erie. Shop No. 559. Traction or railroad truck mounting. 32-ft. boom. Bucket-operating.
1—10-ton Industrial, 4-wheeled. Shop No. 1989, 40-ft. boom, bucket operating.
1—15-ton Brown Hoist, 42-ft. boom.
2—23-ton Type "B" McMyler. Shop Nos. 2015 and 2108. 40-ft. booms, bucket-operating.
1—15-ton Ohio. Shop No. 3441. 8-wheeled, M.C.B. trucks. 40-ft. boom, with 10-ft. extension, bucket-operating drums, 1-yd. bucket.
1—25-ton Industrial, 8-wheeled. Shop No. 3261. Bucket-operating, 55-ft. boom, with 20-ft. extension.
1—25-ton Browning, 8-wheeled. Shop No. 1560. 50-ft. boom, bucket-operating drums and 1½-yd. Mead-Morrison clam shell bucket.
1—Gantry Crane. New in 1919; 48-ft. boom, 15-ton cap., at 18-ft. radius; 7-ft. 10¼-in. gauge, 12-ft. wheelbase, self-propelling. base of boom 17-ft. above track. Bucket-operating drums. Weight, 50 tons.

BUCKETS

1—1-yd. Class "M" Page Dragline.
1—2-yd. Class "S" Page Dragline Bucket.
1—3½-yd. Class "C" Page Dragline Bucket.
1—1-yd. Browning Clam Shell. Reeved type.
1—1¼-yd. Williams Hercules Clam Shell.
1—1¼-yd. Williams Favorite Clam Shell with teeth.
1—1½-yd. Brown Hoist Clam Shell.
3—Mead-Morrison 1½ yd. Clam Shells.
2—1¼-yd. O. & S. Coal Loading Clam Shells.

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CABLEWAYS

11—3 and 5-ton, Street Bros. (Howson) Cableways, complete with automatic dump buckets.

COMPRESSORS

1—2-stage, 950 ft. Sullivan, Class N.B. Compressor.

1—2-stage, 1,500 ft. Sullivan, stationary Compressor.

CRANES AND SHOVELS

1—15-ton O & S, 8-wheel M. C. B., 40-ft. boom, bucket operating.

2—Type "B" Erie Shovels, mounted on caterpillars; one with Crane Boom.

1—O & S 7-ton Crane, 30-ft. boom, ¾-yd. clamshell bucket, traction wheels.

1—Byers Auto Crane, 30-ft. boom, ¾-yd. bucket, traction wheels, steam.

2—Thews on traction wheels, 1, Type A1, 1, Type 0.

BOILERS

3—Walsh Widener, 150 H.P. Boilers.

32—Upright Boilers, ranging in size from 30" in diameter by 60" high, to 48" diameter by 120" high. These boilers are suitable for mounting on concrete mixers, all high pressure. We have some boilers suitable for low pressure work, such as heating materials, at very low prices.

1—225 H.P. Bigelow-Manning, size No. 8. Vertical.

LOCOMOTIVES

1—Davenport std. ga. 20-ton, 10x16 cylinders, saddle tank. No. 1497.

2—Porter std. ga. saddle tank, 14x22 cylinders, weight 42 tons, like new, only one year of service, shop Nos. 6768-6771.

3—7-ton, 24-in. ga., Plymouth, gasoline.

6—3-ton, 24-in. ga., gasoline. 3—Plymouth. 3—Whitcomb Fordson.

STEAM SHOVELS

2—78-C Bucyrus, 1923 model, 30 ft. boom, 19 ft. dipper stick, 3-yd. dipper, on caterpillar. Shop No. 4001 and 4124.

Gas or Electric Hoists and Derricks

Available for immediate shipment f.o.b. New York, Chicago, Philadelphia, Pittsburgh

GASOLINE OR ELECTRIC HOISTS

Large quantity American double drum hoists with attached swinging gear, capacity 6000 lbs. on single line at 162 ft. per minute with—new 55 H.P. Climax gasoline engine—37 H.P. 220 or 440 volt, 60 cy. 3 ph., A.C. electric motor—35 H.P., 220 volt, D. C. electric motor—or without power for belt drive

2—52 H.P. single drum Lidgerwood, with 220 volt, 60 cy., 3 ph. A.C. motor, complete with one winch head.

1—75 H.P. double drum Clyde concrete tower hoist, capacity 10,000 lbs. on rear drum, 5,000 lbs. on front drum, with 220 volt, 60 cy., 3 ph. motor.

DERRICKS

Large quantity late model American Stiff Leg Derricks, mast 14x14x40 ft. booms 14x14x60 ft., stiff legs, 14x14x50 or 60 ft. sills if desired, with 12 ft. steel bull wheel, for hook work or bucket operation.

Large quantity late model American Stiff Leg Derricks, mast 16x16x40 ft., booms 14x14x80 ft., trussed with hog rods, legs and sills 14x14 with 16-ft. steel bull wheel, arranged for hook or bucket operation.

Also several Guy Derricks, wood or steel, arranged for single line work or for operating clam shell bucket.

DRILLS

2—No. 3½ Keystone drills. 1—No. 5.

6—Model 21, Waugh "Denver" derrick drills.

8—Model 31, Waugh "Denver" column drills.

1—D.W.64, Sullivan column drill.

1—Sullivan tripod drill.

2—Ingersoll-Rand tripod drills.

5—Ingersoll-Rand, Class G.O. 2843 and 2844, Calyx drills with pumps.

STEAM HOISTS

12—Three-Drum Hoists, with or without boilers. Sizes 10x12, 9x12, 9x10, 8¼x10 and 7x10, with separate swingers for derrick work. All makes.

54—Two-Drum Hoists, with or without boilers. Sizes 12x12, 10x12, 9x10, 8¼x10, 7x10, 6¼x10, 6x8, and 5x8. Can be equipped with holding drum for bucket work.

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FOR SALE

Hoisting Engines (Electric)

25—37 H.P. American double drum, with attached swingers banked or side levers, A.C. or D.C. motors.
1—50 H.P. American double drum, with attached swinger, A.C. motor.
1—75H.P.Clyde triple drum, attached or independent swinger, A.C. or D.C. motor.
2—75 H.P. Lambert, double drum, A.C. or D.C. motor.
1—75 H.P. Lambert, double drum, with attached swinger, A.C. or D.C. motor.
1—100 H.P. double drum Lambert, with or without swinger, A.C. or D.C. motor..

Hoisting Engines (Gasoline)

3—50 H.P. American, double drum, with attached swinger equipped with new Hercules gasoline engine.
3—35 H.P. American, double drum, with attached swinger equipped with new Hercules gasoline engine.
2—30 H.P. Lambert, double drum, with attached swinger equipped with new Hercules gasoline engine.

Hoisting Engines (Steam)

1—Lambert 9½x12 triple drum, with butt strap boiler and 6¼x8 independent swinger.
1—Byers 7x10 triple drum, with attached swinger and boiler.
1—Lidgerwood 8½x10 double drum, with boiler.
1—Lidgerwood 8¼x10 double drum skeleton hoist.
1—Lidgerwood 12x12 double drum hoist, skeleton.
1—Lidgerwood 12x12 four drum with two independent winch heads.
1—Lidgerwood 8¼x10 bridge hoist, butt strap boiler, 4 independent winch heads.
1—Lidgerwood 9x10 double drum with boiler.
1—Lidgerwood 9x10 double drum cableway hoists, oversize butt-strap boiler.

Derricks

1—Terry 15 ton stiff leg derrick, 3 line service, 65 ft. steel boom.
20—American stiff leg derricks, 14x14 timbers, 12 ft. bull wheels, 65 ft. booms.
5—3 ton jinniwinks.
Several small derricks, 25 to 40 ft. booms.

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Approximately 2,000,000 ft. of lumber, 4x10, 12x12 and other miscellaneous sizes. Long Leaf Yellow Pine.

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We have over 1000 air tools: Chicago-Pneumatic; Ingersoll-Rand, Thor. Prices unusually attractive.

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Construction **WE BUY—SELL—TRADE—RENT** *Equipment*

CRANES

1—Marion "32" on caterpillar.
1—Type "B" Erie Caterpillar with Shovel Attachments.
1—Erie "B" 32-ft. Boom, ¾-yd. Wms. Bkt.
1—O & S 12-ton Cat., Gas Power, 50-ft. Boom.
2—No. 8-C 8-wheel Browning Loco. Cranes.
1—Marion 21 Steam Crane on Cat.
1—18-ton O. & S. Std. Ga., 57-ft. Boom.

HOISTING ENGINES

1—12x12 D/D Lidgerwood.
1—10x12 D/D Lidgerwood with boiler.
2—8¼x10 D/C D/D's with Boilers.
8—7x10 D/D's Am. La Lidg. Mundy.

DERRICKS

1—Wood Stiff Leg Derrick; Boom, 60 ft. x 14x14, rigged for 2-line work, fitted with Terry Irons.
1—Insley Steel Guy; Mast, 115-ft.; Boom, 100-ft.; cap., 10 tons.
1—Steel Stiff Leg Derrick, with 100-ft. Sectional Boom; cap., 7½ tons, complete with Bull Wheel.

DRAGLINES

1—Bucyrus Class "24."
1—Marion 21, Steam Cat.
1—Monighan 2-T Walker, Oil Engine Drive.
1—Monighan 3-T Walker, Diesel Engine.
1—Monighan 1½-T Walker Type.
1—P & H 210 Caterpillar.
10—Others various makes and sizes.

SHOVELS

1—Type "B" Erie Full Cat.
1—Type "B" Erie Caterpillar with Crane Attachments.
2—Model 4 Keystone Excavators.
22—Marion and Bucyrus, mounted on Cat. Trac. Wheels and R. R. Type from ¾ to 4-yd. cap.
1—Marion 37 on Cat. with 1¾-yd. Dipper.
1—30-B Bucyrus on Cat.
1—Bucyrus 175 Stripping Outfit.

AIR COMPRESSORS

1—Sullivan 175-ft., on Trucks, with 4-Cyl. Motor.
1—8x8 Fairbanks with 20-hp. A.C. Motor.
1—Chicago 10x12 Belt Drive.
1—Ing-Rand Port. 5x5, Gas Drive.

CRUSHERS

1—No. 5 Gates Gyratory. We also have a number of Jaw Crushers, Screens, etc., suitable for gravel pits and quarries.

LOCOMOTIVES

1—Std. Ga. Davenport, 21-Ton, Saddle Tank.
1—36 in. Ga. Burton, 8-ton Gas.
1—36-in. Ga. Porter 18-ton, Saddle Tank.
1—36-in. Ga. Davenport, 14-ton Saddle Tank.
1—24-in. Ga. Plymouth, 3-Ton, Gas.

CARS

25—24-in. Ga. Western 1-yd. Dump Cars.
10—24-in. Ga. Western Flat Cars.

BUCKETS

1—1-yd. Hayward Class "E" Clam Shell.
20—30 to 35 cu.-ft. Controllable Bottom Pumps.
1—¾-yd. Class "E" Hayward.
1—¾-yd. Williams Favorite.
1—¾-yd. Standard.

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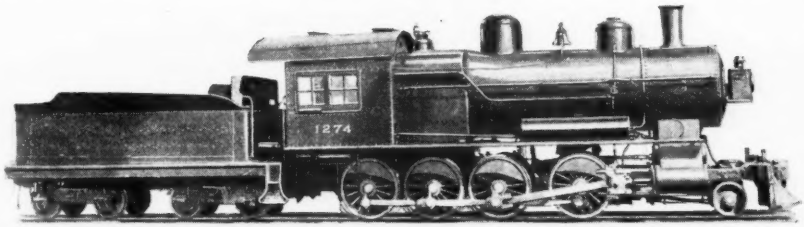

3 Duplicate; 82-Ton; 20x26″ Consolidation Type; Piston Valve; 200 Lbs. Steam; 48″ Wheel Centers; Tractive Power 34,000 Lbs.; Thoroughly Overhauled; I. C. C.

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5—75-Ton; 20x26″ Consolidations; 44″ Wheel Centers; 190 Lbs. Steam; Tractive Power 33,590 Lbs.; I. C. C.
3—85-Ton; 20x26″ 12-Wheel Consolidations; Piston Valve; 48″ Wheel Centers; 200 Lbs. Steam; Tractive Power 34,000 Lbs.; I. C. C.
4—92-Ton; 21x28″ Consolidations; Piston Valve; Wide Firebox; 200 Lbs. Steam; 50″ Wheel Centers; Tractive Power 38,000 Lbs.; Some Outside Valve Gear; I. C. C.
1—125-Ton Shay Geared; 200 Lbs. Steam; Tractive Power 53,000 Lbs.; I. C. C.
1—60-Ton; 1924″ 6-Driver Saddle Tank; New Asme Boiler in 1921.

WILL EXCHANGE FOR LIGHTER POWER, ETC.

Have other equipment overhauled and ready

—RELAYING RAIL—

Southern Iron & Equipment Co. Atlanta, Ga.

FOR SALE OR RENT

STEAM SHOVELS

1—70-C Bucyrus. Shop No. 1749. Standard gauge, railroad, 2½-yd. dipper.

1—Model 60 Marion. Shop No. 1463. Standard gauge, railroad 2½ yd. dipper (butt strap boiler).

1—18B Bucyrus, revolving. Shop No. 1764. Traction wheels, ⅞-yd. dipper.

1—Type B Erie Revolving Steam Shovel, traction wheels, standard boom, ¾-yd. dipper.

1—Model 212 Marion (revolving). Shop No. 4620. Mounted on trucks, 55-ft. boom, 34-ft. dipper stick, 1¾-yd. dipper. Only used enough to be broken in; compares favorably with new.

1—Model 28 Marion, standard revolving. Shop No. 2804, traction wheels, ⅝-yd. dipper.

1—Little Giant Railway type, standard gauge, equipped with standard boom, 1¼-yd. dipper.

DRAGLINES

1—210 P & H Gasoline. No. 1349, on caterpillars. 76-hp. Twin City Engine, 48-ft. boom, 1-yd. bucket. Burns kerosene oil fuel.

1—Class 14 Bucyrus, steam operated, on caterpillars, 60-ft. boom, 2-yd. Page bucket.

1—Class 24 Bucyrus, steam operated, skids and rollers, 100-ft. boom, 3½-yd. bucket.

1—Class 24 Bucyrus Electric Driven, skids and rollers, 100-ft. boom, 3½-yd. bucket.

DUMP CARS

18—12-yd. Western Hand Dump Cars, Standard gauge.

35—1½-yd. Western, 24-in. gauge, Dump cars.

DIPPER

1—¾-yd. dipper complete for Model 18 Osgood Shovel.

FOR RENT ONLY

1—20B Bucyrus, Revolving Steam Shovel, high lift. Shop No. 4309. Mounted on caterpilars; ¾-yd. dipper.

The above list is constantly changing. No matter what your machinery requirements are, write us—we may have it.

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534 National Life Bldg. Chicago, Ill.

Telephone Randolph 2580

CRANES

McMyler 25 ton 8 wheel 50-70′ Boom.
Browning 15-20 ton 8 wheel 50′ Boom.
O & S 12 ton Cat. Gas 50′ Boom 1 yd. Bucket.
Byers Model 10 Cat. Gas ¾ yd. Bucket.
P. & H. 205 Gas 30′ Boom ½ yd. Bucket.

SHOVELS

Bucyrus 175B 75′ Boom 3½ yd. Dipper.
Marion 76 R. R. Type 3½ yd. dipper.
Marion 37 Cat. Electric high lift.
Marion 36 Cat. high lift 1¼ yard.
Marion 36 Cat. standard 1½ yard.
Erie B Cat. ¾ yard.
Erie Type A Cat. ½ and ⅝ yard.
P. & H. 206 Cat. Gas ¾ yard.
Insley Cat. Gas ½ yard.

DRAGLINES

Bucyrus 14 Cat., 60′ Boom 2 yard.
P. & H. 210 Gas 40′ Boom 1¼ yard.
Northwest 40′ Boom 1 yd.
Austin No. 5 Combination 1 yd.

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Gates Gyratory No. 7½, 5, 4, 3.
McCully Gyratory No. 3.
Allis Chalmers Jaw 36″ x 48″.
Allis Chalmers Rolls 40″ x 15″.
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1—Farrell 24x36″.
2—Carroll 24x36″, manganese fitted.
1—No. 4 Gates, straight drive.
1—No. 3 Traylor gyratory.
1—No. 3 McCully gyratory.
1—Farrell 9x15, mounted.
1—Gates, 7x10, practically new.

CRANES

1—Browning No. 3, 30 ton, 55 ft. boom.
1—Browning 20 ton, with 50 ft. boom.
1—Industrial 15 ton, with 35 ft. boom.
1—Northwest Model 104, comb, crane and shovel.
1—Orton & Steinbrenner cat., gas, 40 ft. boom.
1—Austin No. 5 comb. dragline, 2 buck., cat., gas.
1—Orton & Steinbrenner, 10 ton, tract, wheels.
1—Byers Truck-Crane, 30 ft. boom.

SHOVELS

1—Model 103 C Bucyrus, cat., also R. R. trucks.
1—Model 300 Marion stripping shovel.
1—Marion Model 37, caterpillar.
1—Bucyrus 50-B, caterpillar.
1—Marion Model 36, caterpillar.
1—Marion Model 32, caterpillar, new in April.
1—Marion Model 21, caterpillar, high lift.
1—Northwest Model 104, comb. shovel and crane, gas.
1—Bucyrus 14-B, traction, steam.

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2—17 ton Americans 36″ gauge.
3—18 ton Porters, 36″ gauge.
1—12 ton Porter, 36″ gauge.
1—10 ton Davenport, 36″ gauge.
2—21 ton Vulcan, std. gauge.
2—18 ton Porter, std. gauge.
2—Whitcomb 6 ton, 24″ gauge, gasoline.

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Road Rollers, Water Wagons, Finishing Machines, Pavers, Mixers, Pumps, Industrial Track, Cars and Derricks.

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355 ft. Ingersoll-Rand, FR-1, Steam
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599 ft. Ingersoll-Rand, Imperial XB-2, Belted.
888 ft. Ingersoll-Rand, Imperial XB-2, Belted.
1190 ft. Ingersoll-Rnad, Imperial XB-2, Belted.
1145 ft. Chicago Pneumatic OCB, Belt.
1400 ft. Chicago Pneumatic, OCB, Belt.
1500 ft. Ingersoll-Rand, Imperial XB-2, Belt.
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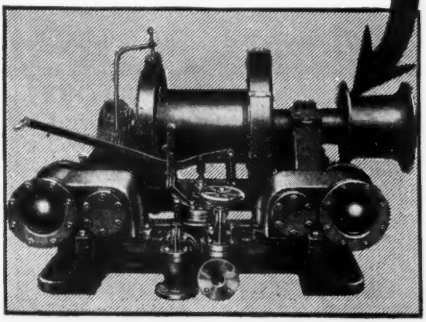

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1—Byers Crane 19′ gauge.

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2—14 Bucyrus on caterpillar.
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14—4 yard two-way dump Western 36″ gauge.
60—24″ gauge Batch Box Cars (road work).

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2—18 ton Porter 36″ gauge steam.
1—18 ton Davenport 36″ gauge steam.
2—14 ton Vulcan 36″ gauge steam.
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Steam, Gas & Electric, all sizes, single, double and three drums.

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2—30-35 ton McMylers.
1—30-ton Ohio.

CARS
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Three 9"x15", One 10"x20", Two 12"x24", One 15"x30", One 18"x36", One 24"x36", One 36"x42", and One 22"x50" Jaw Crushers.

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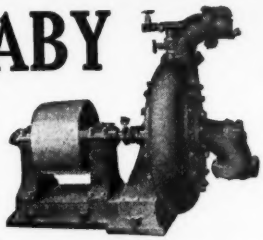

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Royal E. Burnham

Patent Attorney

Continental Trust Bldg., Washington, D. C.

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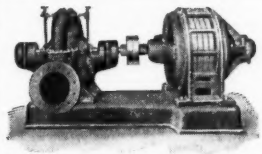

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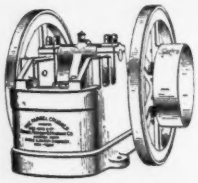

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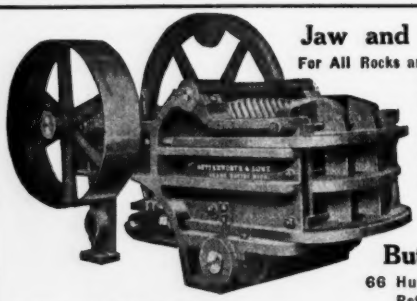
Thousands in use on the hardest rock. Built in all sizes, 6"x3" to 60"x48". Complete rock crushing plants designed and equipped, also sand and gravel, washing and screening plants.

Send for latest bulletin E.

Earle C. Bacon, Inc., Engineers, 26 Cortlandt St., New York



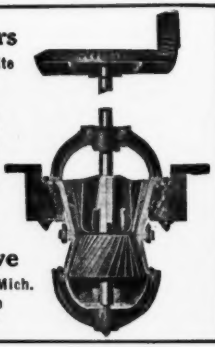
Jaw and Rotary Crushers

For All Rocks and Ores Softer Than Granite

GYPSUM MACHINERY

We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

SPECIAL CRUSHER-GRINDERS FOR LIME



Butterworth & Lowe

66 Huron Ave., Grand Rapids, Mich.

Nippers—17x19", 18x26", 20x30", 24x36" & 26x42"

Rotaries—20" to 47" inside diameter. Many variations.

FLORY HOISTS

Flory Hoists, Cableways and Dredging Machinery are backed by 50 years of successful experience. They are built for hard work, are dependable, and very efficient in operation. Flory engineers will design a hoist for your special requirements if necessary.

STEAM—ELECTRIC—
GASOLINE—BELT

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S. FLORY MFG. CO.
Bangor, Penna.

SUCCESSFUL PERFORMANCE GUARANTEED

DAKE SWINGING ENGINES

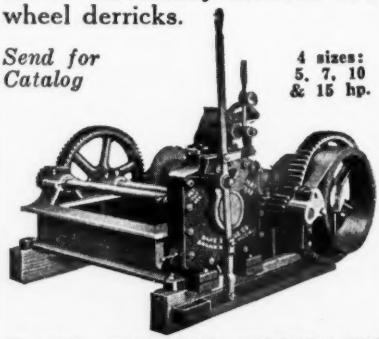
PRODUCE

Quicker Swings
More Work
Less Trouble

The experience of use has proven them—That's why they are so universally used on bull wheel derricks.

Send for Catalog

4 sizes: 5, 7, 10 & 15 hp.



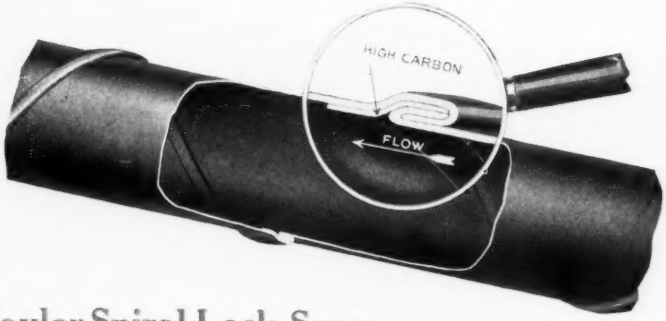
DAKE ENGINE COMPANY
Grand Haven, Mich., U. S. A.

The Spiral Lock Seam Pipe with the Smooth Inside

for

Sand & Gravel Conveyance

and Water Supply Lines



Naylor Spiral Lock-Seam Pipe

Where it is to be used for conveyance of SAND AND GRAVEL or other abrasive materials the high carbon wearing strip is inserted greatly prolonging its life.

For WATER SUPPLY Lines our pressure pipe, asphalted inside and out, with the added strength of the four ply lock-seam, is ideal.

Made from No. 16 and No. 10 Gauge from 6″ to 30″ in diameter.

Write for a sample and prices.

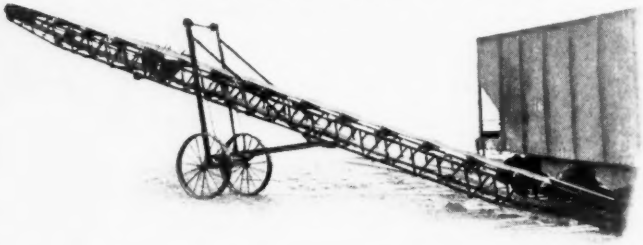
Naylor Spiral Pipe Company

1230 East 92nd Street, Chicago

Our Pipe Users Are Our Pipe Boosters

An Atlas Conveyor

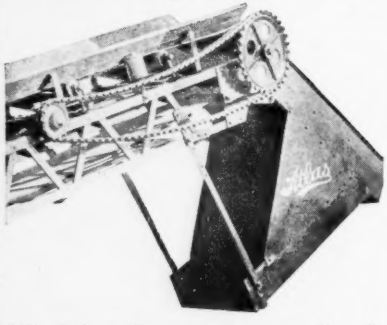
Will Lower Costs



One of the salient points of the Atlas Conveyor is its adaptability in handling all kinds of loose as well as bulky materials. It will lower your loading as well as unloading costs.

There are no unnecessary parts to get out of order and delay the work. On gasoline engine driven outfits LeRoi power units are standard equipment. All 18 and 24-inch width belt conveyors, equipped with Alemite industrial fittings throughout.

Let us send you our latest bulletin which gives detail information on all Atlas conveyors. They are built in lengths up to 100 feet—two styles—suitable for all conveyor needs. We will gladly aid you in selecting the type machine you will find most satisfactory if you will let us know the kind of material you wish to handle.



All Atlas Conveyors can be furnished with shaker screen attachment as well as screening chute.

ATLAS ENGINEERING CO.
3007 Galena St.
MILWAUKEE, WISCONSIN

The Value of Experience

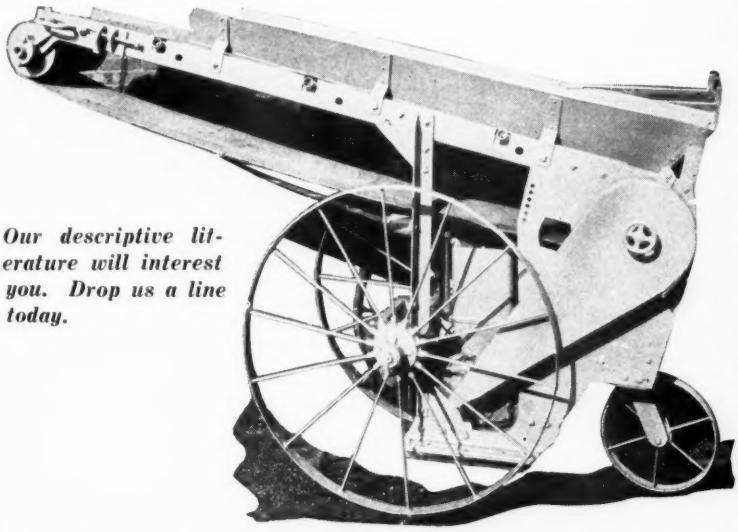
"We have kept a close check on our loading expenses for a year. I don't see any warrant for a special loader."

"Brother, we've checked our loading costs over many years of operation. In the past year our Ottumwa has saved us its purchase price many times over."

Ottumwa Loaders Pay Their Way

They do load efficiently and they do cut loading costs. One Ottumwa Loader will load a car much more quickly than a loading gang, and requires very little attention.

Just two adjustments,—one each for the two ends of the car—are all the attention it needs until the job is finished.

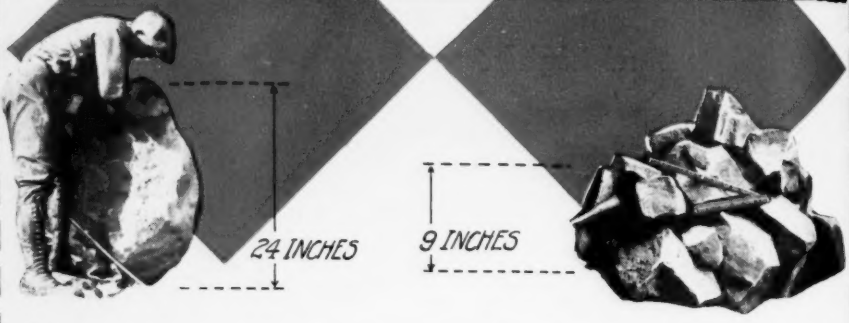


Our descriptive literature will interest you. Drop us a line today.

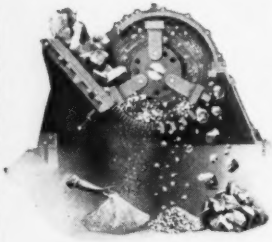
OTTUMWA BOX CAR LOADER CO.

OTTUMWA, IOWA

24 inches Vs 9 inches



Compare the Feed of the "Jumbo" with any other Crusher of equal price



Sectional view of "Jumbo" crusher showing how any size product can be made by using grates with larger or smaller openings and by adjustment of the patented front end.

More "Jumbo" Hammer crushers were sold in 1925 to make commercial size stone than ever before. The reasons why are obvious. They handle bigger rock—24" compared to 9" handled by other types of same selling price—and reduce to the size desired in one operation. No primary breaker is needed nor any great amount of secondary blasting or sledging. Investment is 50% to 70% less, crushing costs 35% to 53% lower (by actual auditors' reports).

Cleaner Macadam.—"Jumbo" crushers can be adjusted to make no more fines than jaw or gyratory crushers. E. P. Jones, Florence, Kansas, crushing 24" rock, says: "Makes no more fines than former jaw crushers and ballast is better." Write for data and list of nearby users of "Jumbo" crushers.

Williams Patent Crusher & Pulv. Co.
802 St. Louis Ave., St. Louis Mo.

Chicago	New York	San Francisco
37 W. Van Buren St.	15 Park Row	415 5th Street

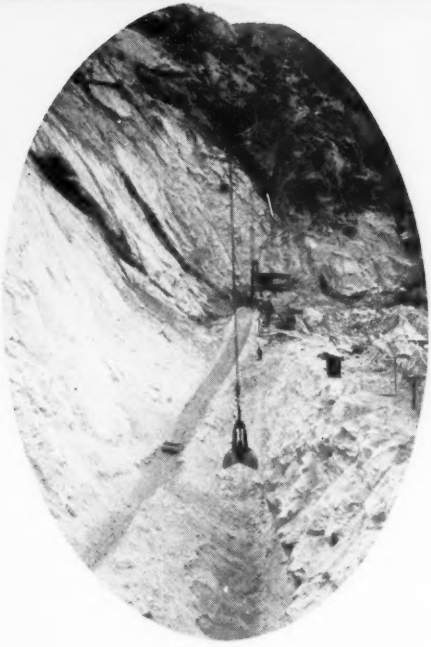
ORIGINAL PATENTEES AND WORLD'S LARGEST BUILDERS OF HAMMERMILLS

Williams

PATENT CRUSHERS GRINDERS SHREDDERS

THE WILLIAMS PATENT CRUSHER & PULVERIZER CO. ST. LOUIS, MO. U.S.A. TRADE MARK REG. U.S. PAT. OFF.

Hayward Buckets



"Dig for all the world"

With endless details of management demanding your attention, doubtless you would welcome the practical advice of Hayward Engineers based on information gathered through a world-wide experience in solving handling problems.

Every phase of bulk material handling has been included in the wide variety of conditions successfully met by Hayward Equipment. The view shown here is but one of thousands of Hayward installations—each one profitable because the **Hayward Bucket is fitted to the job.** Hayward Engineers are at your service. Let them tell you of the economies made possible by Hayward Buckets.

THE HAYWARD COMPANY

54-56 Church St., New York, N. Y.

Electric Motor Buckets

Clam Shell Buckets

Orange Peel Buckets

Drag Scraper Buckets

Counterweight Drums

Automatic Take-Up Reels

Skid Excavators and Dredges

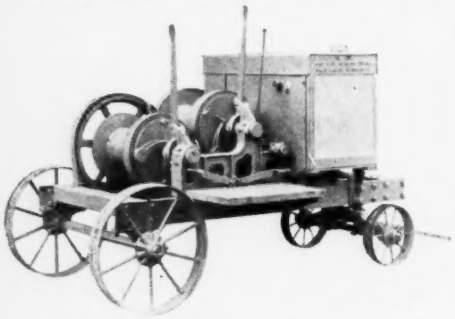
HAYWARD BUCKETS

HAYCO

Without a Struggle

The Ebel Dragline Hoist will serve you consistently and inexpensively. Twenty-three years of constant improvement has produced this energetic hoist to meet the operators numerous demands and it has made good n every instance.

Strong and Durable But Light in Weight



The Ebel Drag-line Hoist is of steel construction, practically built of steel, it is compact and simple in design, all excess weight having been eliminated without any sacrifice strength or durability, machine cut steel gears overcome friction and power loss, Alemite lubrication and interchangeable parts make for low maintenance cost. An Ebel Hoist is ready to serve you whatever your needs may be.

Our Model "BC" illustrated herewith will handle a ¾ yd. bottomless Scraper and weighs but 3,500 lbs. Communicate with us at your earliest opportunity. No matter how complicated your condition we can serve you well.

Ebel Duplex Bottomless Power Scrapers

Are so designed that both top and bottom are made alike so no matter which way the scraper lays it is right side up and ready to dig, also giving the same amount of wear that you would get out of two ordinary scrapers and by using the (Heller Patent) Reversible Draft no matter which side is up the draft is always right.

LANSING MOTOR & PUMP CO.

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Living Up to Their Name

The PERFECT CLASSIFIERS shown above are installed on the dredge of T. L. Herbert & Sons Co., of Nashville, Tenn., who report that the machines are doing satisfactory work in every respect.

PERFECT CLASSIFIERS

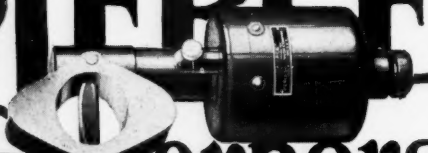
will produce clean materials at all times, whether sand, gravel, limestone, phosphate or coal is washed.

WRITE FOR FULL INFORMATION

Perfect Classifier Company

105 FIRST AVE., SOUTH, NASHVILLE, TENN.

PIERCE Governors



for automatic speed control

PROTECT your engines in all kinds of service—motor trucks, loaders, conveyors, concrete mixers, etc. Pierce Governors automatically hold the engine speed within safe limits regardless of careless of reckless operators, or sudden variations in the load. Over 150 manufacturers of various equipment are obtaining positive regulation of engine speed with Pierce Governors, including the following advertisers in Pit and Quarry.

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Write us **now** for descriptive literature. Learn how other users of power machinery are saving time and money, and prolonging the life of their equipment, with Pierce Governors. Address:

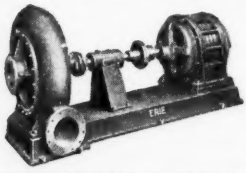
THE PIERCE GOVERNOR COMPANY

"World's Largest Governor Builders"

Anderson, Indiana

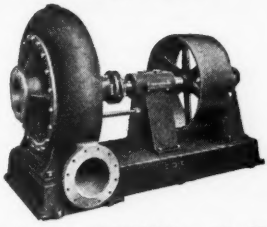
Thirty-Five Years of Research

have developed ERIE DREDGING PUMPS to their present Standard of Excellence.



If you have any difficult pumping problems in your sand or gravel plant consult our engineers. No obligation whatsoever.

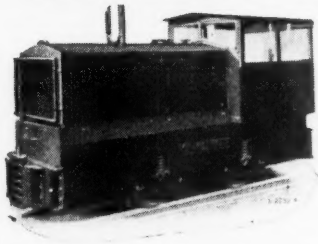
New Bulletin No. 41, sent on request.



ERIE PUMP & ENGINE WORKS, 153 Glenwood Ave, MEDINA, N. Y.

Milwaukee Gasoline Locomotives

For Industrial Haulage



Built in sizes from four to eighteen tons. For all Gauges of Track.

FOUR SPEEDS—GEAR DRIVE

There's a size for every purpose.

Write for catalogs M-129 and M-136

MILWAUKEE LOCOMOTIVE MFG. CO.
Milwaukee, Wis.

THE Carbic SYSTEM

The "Midnight Sun"
Easily Portable

Twelve Hour Charge Approved by Underwriters
Fuel Pressed into Cakes

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Recharged in Three Minutes

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Carbic Manufacturing Co.
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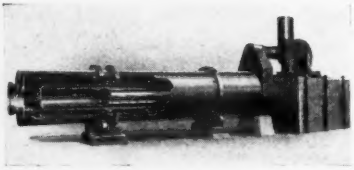
Our New 120 Page Edition of "BIG BLAST Hole Drills" is Ready—Write for it . . .

The Sanderson Cyclone Drill Co.
ORRVILLE, OHIO

Ruggles-Coles Dryers



Built to dry at the lowest ultimate cost.

Ruggles-Coles Engineering Co.
York, Pa.

120 Broadway, New York
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Crushing and Grinding
Material Handling
Old Equipment Modernized
Properties Examined

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Engineer
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Portland Cement Plants
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For Separating Dry Ground Materials

80 Mesh to 350 Mesh

GAYCO CENTRIFUGAL SEPARATORS

Six Sizes—30 Inch to 14 Feet Diameter

RUBERT M. GAY COMPANY, Inc. 114 Liberty St., N. Y.

How Is Your Equipment Standing Up?

If you have not tried **TISCO MANGANESE STEEL** you don't know the satisfaction of a dependable plant. You can cut repair bills and increase production by using it where the wear is hardest. In parts for shovels, crushers, screens, pumps, chutes, etc.

ASK THE MACHINE BUILDER FOR IT

TAYLOR WHARTON IRON & STEEL CO.
HIGH BRIDGE, N. J.

STEEL BINS for Sand and Gravel Storage

All Steel
Quick Truck Loading
No Dead Storage
Self Cleaning
High Salvage Value
Simple and Strong
Easy to Erect
Ample Clearance

Many Sizes:
85, 135, 210, 300 Tons

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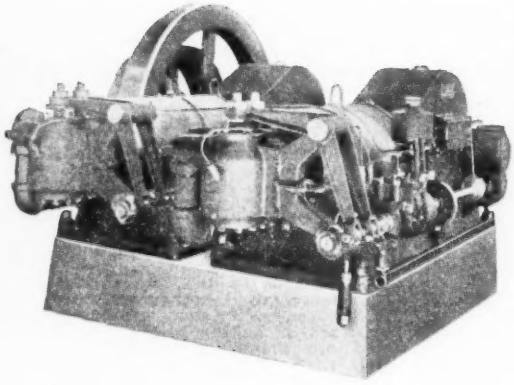


McEwen

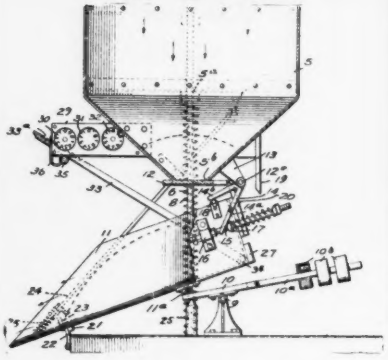
Four Cycle Oil Engines Exhaust Completely

The McEwen Four Cycle operation permits the engine to completely exhaust the burnt gases before taking in a clean charge.

These engines, by means of a blow torch attachment, will start quickly on the same fuel as they regularly burn.

McEwen Brothers **Wellsville, N. Y.**

Automatic Weighing Device



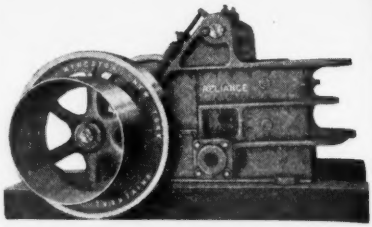
JOHN MARKMAN, Inventor

Accurate and Efficient

GRAVEL PRODUCERS—Your gravel weighed at the pit assures no overload or underload which means you receive payment for every ton of material sold. The machine is equipped with automatic tally and registers the daily tonnage. It can quickly be adjusted to yard, ton or batch.
ROAD CONTRACTORS—Material weighed means accurate proportions per batch assuring the proper mixing results necessary for permanent concrete roads.

Write for further information.

J. H. MARKMAN
Forreston, Ill.



POSITIVE LUBRICATION

under all conditions is assured on RELIANCE units through the use of a force feed GREASE system instead of oil.

IT WILL PAY YOU TO INVESTIGATE THIS FEATURE!

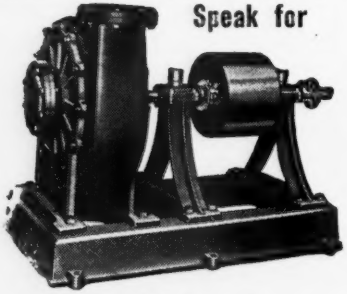
We offer a complete line of crushing, screening and washing equipment in capacities from 50 to 1,500 tons per day.

WRITE FOR CATALOG AND PRICES

Universal Road Machinery Co.
KINGSTON, N. Y.

"RELIANCE" THE CRUSHER WITH THE LONGER LIFE

Sand and Gravel Producers Speak for



The Lightning Pump

The Empire Sand and Gravel Company of Marshalltown, Iowa, says:

"This new pump has surprised all of us and we have had about fifteen years in actual experience in pumping sand and gravel. There are so many superior features about this pump that are not found in other pumps, viz., Such large capacity for so light and neat a design, its wonderful wearing qualities, its simplicity. It is only a few minutes work to unbolt and take it down and change any worn part and throw it right together again."

Full descriptive Bulletin on request.

KANSAS CITY HAY PRESS CO.
KANSAS CITY, MISSOURI

A Conveyor for Many Uses

The importance of portability in a conveyor is a factor of prime consideration. Not only is the Burch All Steel Conveyor highly portable but it has unusual wear resisting qualities. A trough type conveyor belt especially adapted to handling abrasive materials together with features of quick adjustment aid in making Burch Conveyors most serviceable for a wide range of uses.

Burch Conveyors require little attention and give big results. Furnished with gas or electric motor. Descriptive catalog on request. Ask for Catalog No. 16.

THE BURCH PLOW WORKS CO.
324 No. Thoman St.
CRESTLINE, OHIO

Old World Elegance in Modern Setting

To assure a pleasant visit to the Convention city, stay at the Biltmore!

Every corner of this magnificent structure will excite exclamations of appreciation over its old world atmosphere; and yet, from the moment of your arrival, you will realize that the spirit of modern service and 20th century comfort have been added to the surpassing beauty of your surroundings.

RATES Single: $3.50, $4.00, $5.00
Double: $6.00, $7.00, $8.00

Atlanta Biltmore

Holland B. Judkins, Vice-Pres.-Mgr.

Wm. C. Royer, Asso.-Mgr.

The easy adaptability of Taylor Spiral Riveted Pipe to the contour of the ground to be covered is well illustrated by the above photograph.

Water...

WHEREVER it becomes a matter of piping in water, economy dictates that Taylor Spiral Riveted Pipe should have first consideration. Its combination of great strength with light weight gives it preference particularly where lines are to be laid through remote localities. It is made in sizes from 3 to 42 inches in diameter, supplied either galvanized or heavily asphalt coated. Figure on Taylor Spiral Riveted Pipe for your next water supply line. 80-page descriptive catalog will be mailed on request.

American Spiral Pipe Works
Box 485, Chicago, Ill.

New York Office: 50 Church St.

Also manufacturers of Taylor Forge Welded Pipe. Sizes 16 to 96 inches diam.

P & Q 1-I-RTG

TAYLOR *Spiral Riveted* PIPE

BIGGER AND BETTER

The New 1925 Model

NELSON

FORDSON LOADER

"The Standard of Service"

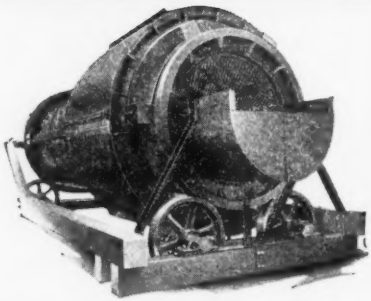
Sixty to eighty yards an hour
Self feeding without hand labor.
Slow crowding keeps buckets full.
Strong, well designed frames.
Saves labor and truck time.
All work in plain sight of operator.
Swivel spout ten feet high.
Side or end loading of big trucks.
Digs its own road into the pile.

Write for Catalog and Prices, or Ask your Ford Dealer.

N. P. NELSON IRON WORKS, Inc.
Passaic, N. J.

Where we lead others follow

IN THE LEAD SINCE 1900



Years of Service Prove Their Dependability

The remarkably low operating costs, high output and extraordinarily long service of Acme machinery should prompt you to investigate the Acme line of crushers, pulverizers, screening plants, elevators and bins. Whatever your need and specific requirements may be, there is an Acme machine to meet it. Write for our catalog—today.

ACME ROAD MACHINERY CO.
INC.
Main Office and Factory—Frankfort, N. Y.

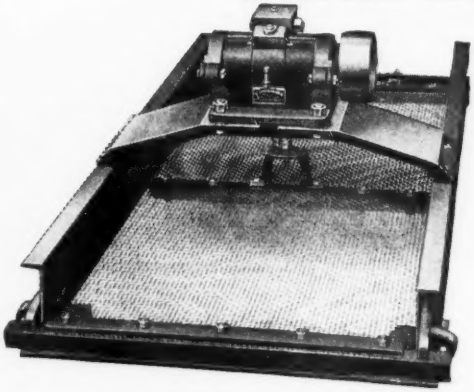
TRADE MARK ACME REGIS. U.S. PAT. OFF.

ACME ROAD AND QUARRY MACHINERY

HAVE YOU SEEN THE

Leahy NO-BLIND Screen

"It Sure Does Vibrate"



This screen will care for 40 yards of pit gravel per hour removing the sands better and cleaner than any other type of screen.

Power consumption, ½ H.P.

Low up-keep expense.

Low first cost.

Write for Bulletin No. 12-A and Prices

THE DEISTER CONCENTRATOR COMPANY

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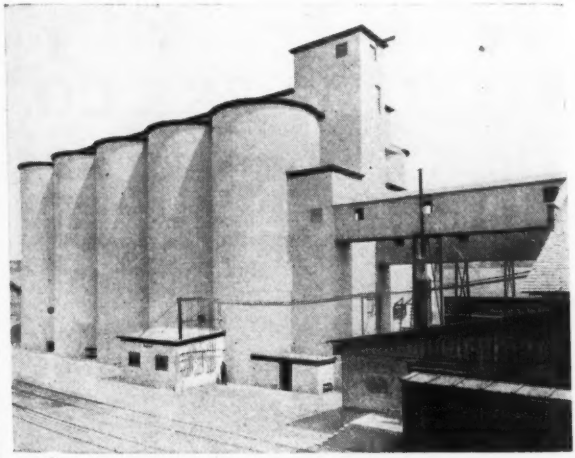
FORT WAYNE, INDIANA

60 Water St.
New York Office:



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SIEGFRIED, PA.

Designers and Builders of
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Pack Houses
Slurry Tanks
Stone Bins
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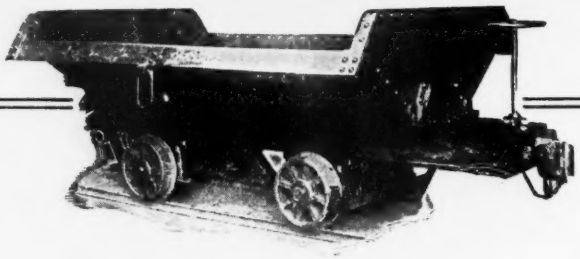
and
Machinery Installations

Designs and Estimates Furnished on Request

Burrell Engineering & Construction Co.
Jackson & Canal St., Chicago, Ill.



QUARRY CARS THAT ENDURE

Under Most Abusive Loading Conditions

ATLAS CARS are designed to reduce haulage costs and last longer

"They Do Both—Why Not Investigate?"

Engineering Service Especially Developed in Quarry Car Design

THE ATLAS CAR & MFG. CO.

1140 Ivanhoe Road **CLEVELAND, OHIO**

Quarry Cars, Rocker and Gable Bottom Cars, Special Cars of All Kinds

VARIETY
IRON AND STEEL WORKS CO.

ENGINEERS : FABRICATORS : ERECTORS
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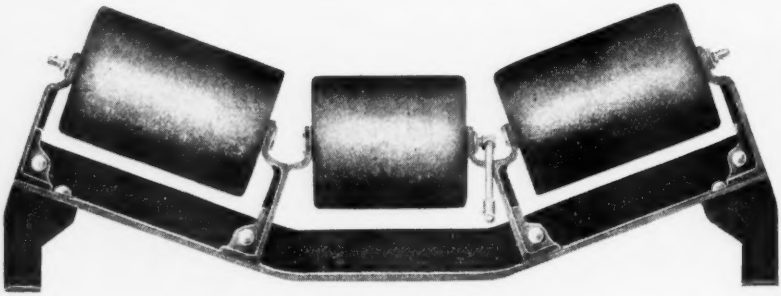
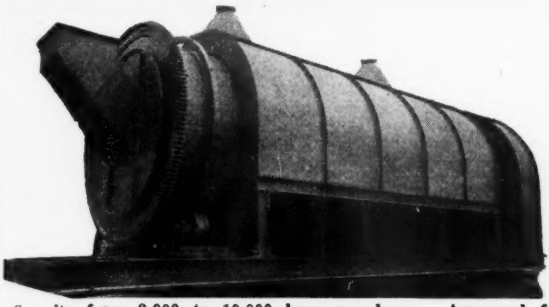


MAIN OFFICE & WORKS, 1277 East 40th St., CLEVELAND, OHIO
WESTERN OFFICE: BRADY CONVEYORS CORP., 20 West Jackson Blvd., Chicago



Capacity from 2,000 to 10,000 bags per hour. Arranged for either gear or chain drive.

10,000 Pounds Per Hour—

Reclaimed Cement

The profit from such a salvage of cement will soon pay for the installation of the Continuous Cement Bag Cleaner. And after that the machine gives you this net profit.

The capacity of the continuous Bag Cleaner runs as high as 10,000 bags per hour and it reclaims on an average one pound per bag.

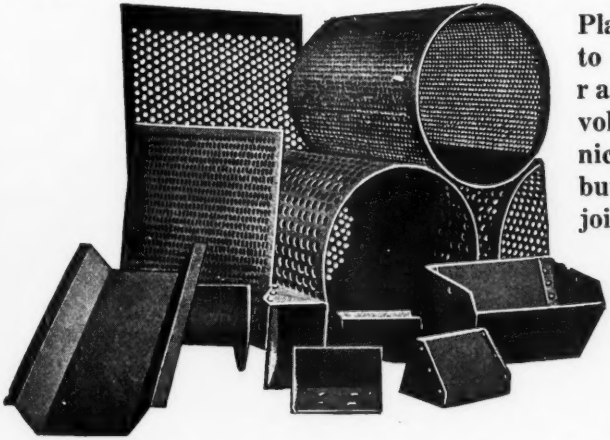
You cannot afford not to follow the example of the largest mills in the country.

NAZARETH FOUNDRY AND MACHINE COMPANY

Works: Nazareth, Pa. New York: 106 Front St.

Perforated Metal Screens

FOR STONE, SAND, GRAVEL, ETC.



Plates flat; rolled to diameter or radius for revolving and conical screens butted or lap joints.

Elevator Buckets

in all styles and sizes

HENDRICK MFG. CO., 39 Dundaff Street CARBONDALE, PA.

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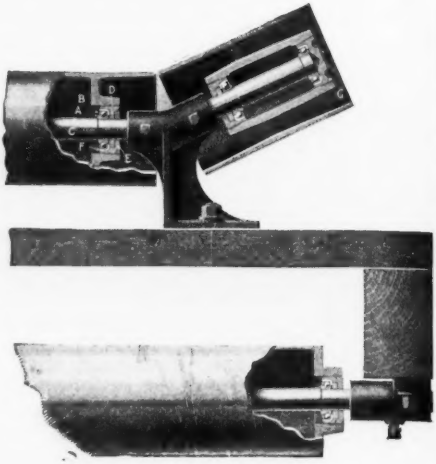
Less Friction—More Volume in Your Conveyor

Conweigh Ball Bearing Idlers on your conveyor will reduce friction to a minimum, thereby saving power and giving you a maximum volume.

We have solved ths costly and bothersome problem for many operators by installing Conweigh Ball Bearing Troughing and Return Idlers. They are of correct design and durable hardened steel construction.

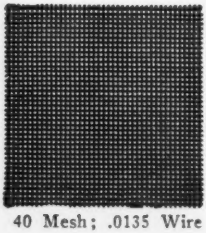
Easy to lubricate, they overcome the ordinary conveyor difficulties.

Write us for information.

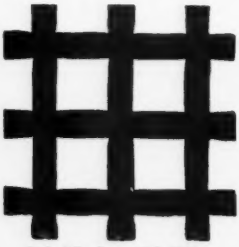


THE CONVEYING WEIGHER COMPANY

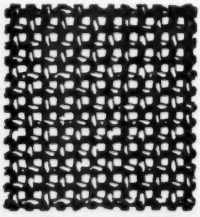
90 West Street ENGINEER & CONTRACTOR New York



40 Mesh; .0135 Wire



2½ Mesh; .105 Wire



12 Mesh; .047 Wire

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"CLEVELAND" Double-Crimped Wire Cloth

Uniform fineness and long service will be assured by its use in screening SAND, GRAVEL, CRUSHED STONE AND CEMENT.

Large stock always on hand; special mesh manufactured to suit requirements at right prices.

THE CLEVELAND WIRE CLOTH & MFG. CO.

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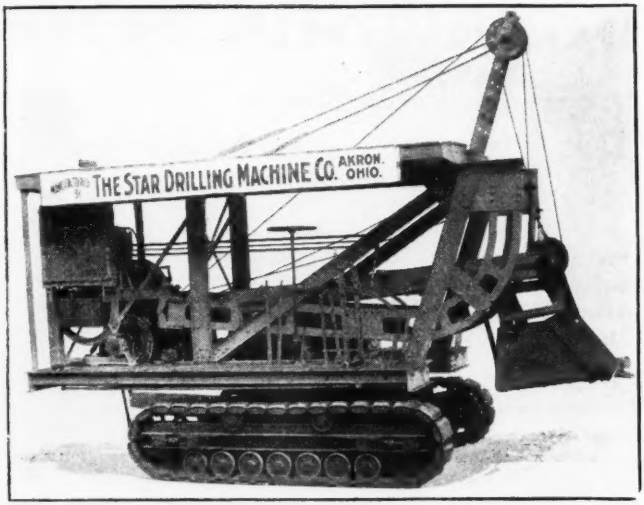


Don't fail to see this compact and efficient

STAR POWER SHOVEL

At the Chicago Road Show (Coliseum Balcony)

Write for Prices and Illustrated Bulletin No. 5

"DOMESTIC"

(Reg. U. S. Pat. Off.)

Portable Air Compressors

The use of an Air Compressor, as illustrated, saves unlimited time and money, both by being easily movable from one job to another, and by delivering the necessary pressure when wanted. The engine and compressor are built as an integral unit, and combine the fewest possible moving parts with highest mechanical efficiency. The Compressor here shown has a 184 cu. ft. capacity and is mounted on rubber tired trailer.

Let us send you Bulletin "AP" giving full particulars

Domestic Engine & Pump Co.

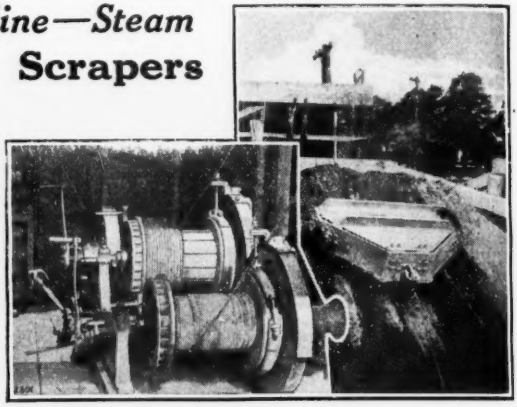
Manufacturers

SHIPPENSBURG, PENNA.

DEPENDABLE "DOMESTIC" POWER UNITS

LIDGERWOOD HOISTS

Electric—Gasoline—Steam on Dragline Scrapers



Lidgerwood Electric Hoist operating a ¾ yard scraper bucket at the plant of the Ashtabula Concrete Products Co., Ashtabula, O.

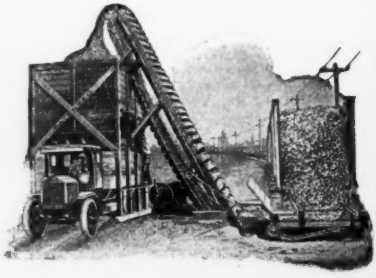
A well designed outfit that increases output and profits from small pits.

LIDGERWOOD MFG. CO., 96 Liberty St., New York

Chicago; Pittsburgh; Philadelphia, Columbus, O.; Los Angeles; Seattle; Tacoma; Portland, Ore. Brown-Marx Bldg., Birmingham, Ala. *Sales Agents*: Norman B. Livermore, San Francisco; Woodward Wight & Co., Ltd., New Orleans, La.; John D. Westbrook, Inc., Norfolk, Va.; Cameron & Barkley Co., Jacksonville, Miami, Tampa, Fla.; Canadian Allis Chalmers, Ltd., Toronto. *Foreign Offices*: Sao Paulo, Brazil; Rio de Janeiro, Brazil; London, England.

Here's What We GUARANTEE

When equipped with proper size feeder, the SUNBURY Automatic Unloader



Will load or unload a 50-ton car in 90 minutes!

***The* SUNBURY Automatic Unloader**

And one man can handle it. The first cost is reasonable and its return from the standpoint of its being able to substantially increase your profits makes it a very profitable investment.

Its automatic feature is important and will commend it to you. It is simple in construction, strongly built and economical in operation.

We will be pleased to send you an illustrated descriptive circular.

THE SUNBURY MANUFACTURING CO.

SUNBURY, OHIO

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Our line of Hoists covers Steam, Electric and Gasoline in Single, Double or Triple Drum and with or without Boom Swinging Attachment.

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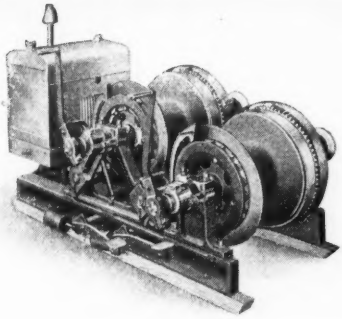

ORR & SEMBOWER, Inc.
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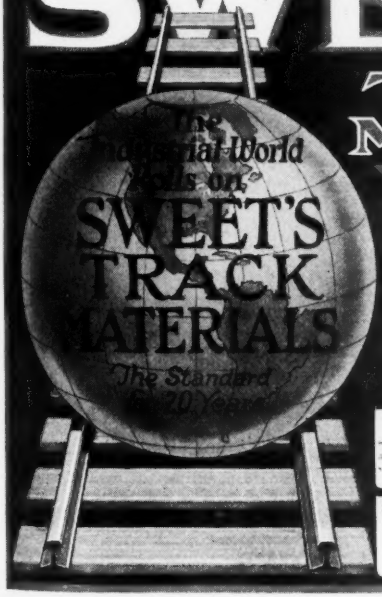
TRACK MATERIALS



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Sweet's Steel Company
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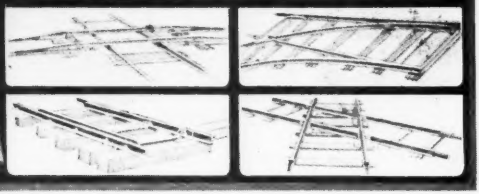

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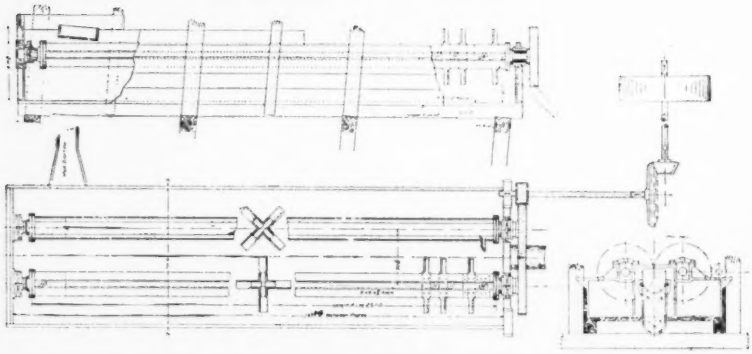
McLanahan—Stone Improved Double Log Washers really bring higher prices for your product, because they **really do** wash it clean.



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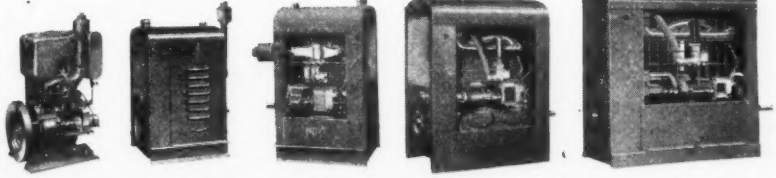
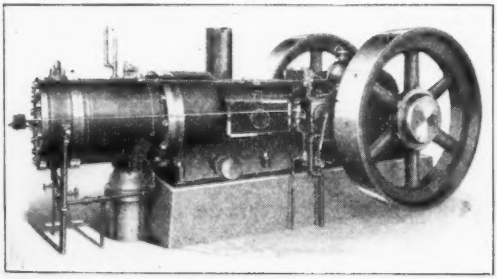


3-6 H. P. *6-9 H. P.* *9-12 H. P.* *18 and 25 H. P.* *40 H. P.*



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SIMPLICITY—the foundation of "PRIMM" Oil Engine design and construction for 24 years—is one important feature responsible for their success in quarries throughout the United States.

The heavy duty construction and fewness of moving parts used in "the simplest oil engine on earth" enables it to operate under the most trying of conditions.

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Caldwell Helicoid, or Continuous Flight Conveyor, rolled from a single strip of metal and with an extremely strong flight, has no laps or rivets. This means: Non-interference with the normal flow of materials, added strength, ease in cleaning, and longer life.

If you need elevating, conveying or transmission machinery promptly, address Caldwell, or nearest Link-Belt office.

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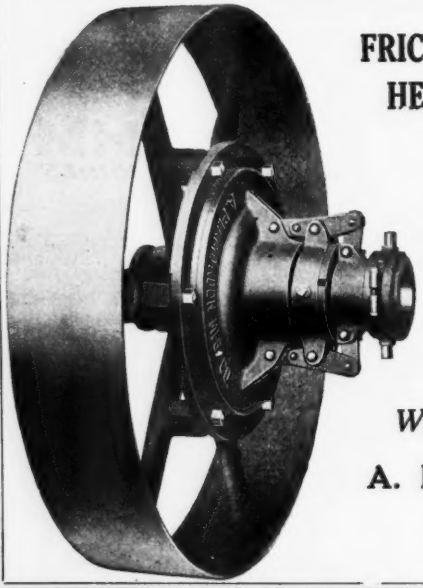

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One big reason for the long life of a Red Seal Engine is the simplicity of its mechanical design—the fewest possible working parts, perfectly coordinated and readily accessible. High quality of materials and workmanship also extensive factory tests are additional factors contributing to its durability.

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